The Builder.

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Mission Church and Hall, Old Kent-road, for Corpus Christi College, Cambridge.—Mr. R. J. Lovell, Architect ..... *Double-Page Ink-Photo.*
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Examples of Mosaic Paving.

IN the large thin folio volume brought out under this title,* Mr. Bolton has undoubtedly initiated a new and valuable method in the illustration of ancient examples of mosaic paving. Published illustrations of such examples have hitherto consisted in general of small drawings in which the pattern or design was delineated with as much truth as could be achieved on a small scale, and the ground of the drawings covered with lines to represent the jointings of the mosaic cubes and convey a general idea of mosaic surface, with little attempt at any precise reproduction of the actual facts of the work in detail. As, however, in ancient buildings much of the character depends on the arrangement of the masonry, so in ancient mosaic much of the character depends on the size, shape, and arrangement of the small cubes which form the design. In measuring old buildings enthusiasts have not infrequently measured and plotted all the jointings of the masonry. A similar process is practically impossible with mosaic, but the jointings of a fair-sized portion can be reproduced the actual size by rubbing, and photographed down to a convenient scale for publication. In this instance the examples are reduced to only one-half the original size, which for purposes of study and comparison is nearly as good as the full-size.

The author is undoubtedly quite right in his remark that "the secret of the art of mosaic paving consists in the due recognition of its cube formation." It is this which gives to the surface that peculiar rich and varied texture which is the special attribute of mosaic. An attempt to carry out the work so carefully and with so much finish as to hide the joints is only taking a great deal of trouble to do what could be done much more completely and with less trouble and cost by intarsia work with large pieces of material cut to the required shapes. Wall decorations in mosaic, especially where the subjects approach a pictorial character (which must always, however, be in subordination to a severe conventionalism), may be carried further in refinement of finish than pavements, but even here the toothed surface must not be refined away; part of the effect of the decoration depends on it. In the case of pavements this rule holds good in a more decisive manner. For mosaic in such a situation is really a form of pebble paving; it has actually been carried out in one or two known instances with natural pebbles, and the roughly-squared cubes of ancient pavements in *opus tesselatum* still preserve something of this character. The surface formed has the practical advantage of being a remarkably good one for foothold; the artistic interest consists in the arrangement of the pebbles so as to form a design. To lose this pebbly character is to lose the whole characteristic of this method of forming a floor. Hence, however the finer methods of *opus vermiculatum* may be applicable to wall and ceiling decoration, it is unsuitable to transfer this method to floors.

It must be admitted, however, that the recognition of this pebble character as suitable to mosaic pavement carries with it a great deal of restriction as to the class of subject and the style of ornament which can properly be treated in a mosaic floor of this type. And in this respect it appears to us that Mr. Bolton's natural enthusiasm for the style of work which he has so well and carefully illustrated has rather misled him. We can see nothing for admiration in the clumsily-designed figures executed in large irregular tesseræ, of which he has given one example full size in Plate iii., a figure representing (so he says) a man swimming. We doubt the interpretation even; the position of the arms might represent the action of "hand-over-hand" swimming, but there is no corresponding action of the legs, and the delineation of the hands and feet is ludicrous in its coarseness. The size of the tesseræ in comparison with the scale of the figure renders it in fact quite impossible to give any satisfactory representation of the figure, and we should be disposed to apply to it the same criticism which Professor Middleton applies to the larger mosaics of Caracalla's Baths: "The floors were mostly of mosaic, with coarse figures of athletes, gladiators fighting with beasts, or tritons and dolphins, all rudely executed with large tesseræ, and usually drawn in the most clumsy and inartistic way possible." Generally speaking, in fact, Roman pavement mosaics, however they may claim the merit of frank recognition of the character of the material, are in an artistic sense bad and coarse in execution and mistaken in taste; they represent subjects which cannot adequately be represented in mosaic of this class, and are far too naturalistic in their aim and conception. A fine exception is the notable pavement from Cirencester (not given in this book) of Orpheus taming the beasts, where Orpheus is in the centre of a circle formed by a conventional wreath or garland, while the beasts and birds, treated in profile, walk round the circle in a regular and symmetrical order; an example of true conventional treatment of a legend, suitable to the material and the situation. But anything nearly approaching naturalistic treatment on a mosaic floor is entirely out of place, both in regard to the method of execution and the position in which the work is placed. Naturally-treated figures are out of place even in a mural mosaic, with small tesseræ; they are doubly out of place on a floor, which is a thing to walk over, and more so than ever when made with large tesseræ, with which anything like correct representation even of silhouette figures is an impossibility. The famous Pompeian boar, given in Plate vi., is equally out of place as far as design is concerned, but it is a very remarkable example of spirited and to a great extent truthful representation or rather indication in work of this kind; the manner in which the cloven hoofs are indicated is especially masterly; but this is work executed in much smaller tesseræ. This figure furnishes Mr. Bolton with matter, however, for a very true bit of criticism, as to the importance of preserving the relation between the ground and the design; and he points out quite rightly the artistic importance of the indication of the ribs of the animal, light against the mass of the rest of the body, thus bringing a portion of the tone of the ground

* "Examples of Mosaic Pavings; from Remains of Floors at Pompeii and Venice, with Additional Patterns from Palermo and Rome." By Arthur Bolton, A.R.I.B.A. London: B. T. Batsford. 1891.

into the figure. Without these the boar would be a dark mass, distinguishable by outline merely. But this boar is obviously, in every respect, the work of a very clever artist, and deserves all the author claims for it, which certainly cannot be said of the "swimming" man before referred to.

It may be questioned whether the best application of mosaic is not found in geometric patterns rather than in designs from life. At all events, where the latter are introduced, they should be of a very conventional type, and treated rather as centre points in a scheme of geometric design than as the main factors of the design. The kind of things that are frequently found in Roman mosaic are really not design at all; merely attempts at realistic representation introduced at random. In geometric patterns for mosaic the Romans were often exceedingly successful, and have indeed produced some of the best pattern designs that have ever been seen; designs which have passed into what may be called "proverbial" use, forming common elements of mosaic design just as proverbs come to form part of common conversation. It was by the use of intercepted circles or segments that some of the best of these diaper designs were produced; one or two examples of this class are given in Mr. Bolton's book, though not among the very best of them. A remarkable piece of pattern-work is given on Plate viii., the pavement of the "House of Sallust;" this is an exceedingly ingenious piece of design as far as its lines are concerned, but one requires something more than line in a mosaic diaper, it should be rather an arrangement of contrasted surfaces than of mere lines. It would be quite possible to work out such a design on the lines of the "House of Sallust" pattern. The employment of a design formed mainly in lines is suitable for scrolls and conventional foliage; but a diaper pattern in lines only has a thin and hard effect. One absolute rule may be laid down, viz.; that nothing in mosaic pavement should be designed so as to give the effect of relief of surface. The Romans were well-known sinners in this respect, and seemed to enjoy the use of shading so as to produce the effect of solid cubes with sinkings between them. It would be impossible to misuse the material or the art of design (so-called) more utterly, and it does not appear that Mr. Bolton has quite the holy horror of this kind of work which we should have expected him to express.

One or two chromo-lithographs are given, showing examples of colour in mosaic. One of these, Plate x., from the house of Holconius at Pompeii, is about as poor a piece of work of the kind as could well be seen, and, both in colour and design, looks like a very commonplace piece of worsted-work for a cheap cushion or footstool. The peacock from the pavement of the Church of San Donato, Murano, is a fine piece of conventionalism in its way; the treatment of the bird, within the limits of mosaic, is excellent, and the colour effect rich and harmonious, but the large irregular pieces of coloured enamel in the tail of the bird, put in in one piece, have not the best effect, and the introduction of large single pieces in this manner, among the smaller cubes of the rest of the work, is quite out of keeping with the proper principle of mosaic, as the author indeed points out in the course of his introductory remarks, though he seems to have passed it over here.

As an illustration of ancient mosaic this book is a new departure which the author might very well follow up on a larger scale in future. He tells us that the book was not planned till after his return from Italy, or some examples would have been included which have now been unavoidably omitted. The method of production enables one to study the character of the ancient mosaic work depicted, almost as well as from the originals; and the plates serve to remind one of what is often forgotten in modern mosaic, that too great symmetry and rigidity in laying the tesserae is not to be desired, and in fact detracts from the proper character of the work, giving it a hard mechanical appearance. Mosaic pavement is a pavement of blocks on a small scale, and should preserve this character whatever design it is worked into; care being taken however that there should be some fit relation of scale between the size of the blocks and the scale of the design. The Roman tendency was to introduce designs too small to be properly defined by the tesseræ, or to use tesseræ too large for the design, whichever way we take it. For a pavement this is a better mistake than using the tesseræ too small; but it is still a mistake, and some of the plates in this book illustrate the fact, though in general they serve to exemplify the true and proper use of mosaic in pavements.

ANCIENT SCULPTURES FROM CENTRAL AMERICA IN THE SOUTH KENSINGTON MUSEUM.

WITHIN the past four years some interesting additions have from time to time been made to the exhibits in the Architectural Court of the South Kensington Museum, in the shape of casts of obelisks, altars, and, in some cases, originals of pieces of sculptured stones from certain of the ruined "cities" or pueblos of Central America. The originals, or the moulds, as the case may be, were brought to this country by Mr. A. P. Maudslay, who has devoted so much time to the research and systematic exploration of the sites of these ancient Indian towns. Most of the objects represented were found at Copan, in Honduras, and there is a large model of the mounds and ruined terraces of that place, clearly showing the enormous extent of the excavations and surveys made and indicating the sites whereon the obelisks, &c., were discovered. Excellent descriptions of the works at Copan have been published by Mr. Maudslay, notably in the "Proceedings of the Royal Geographical Society," Vol. viii., n. s. 1886, pp. 568 *et seq.*, and "Biologia Centrali Americana" *Archæology*, pt. i., 1889. The former also contains descriptions of the remains at Quirigua, whilst the text of the latter work, illustrated by photogravures, is accompanied by a large atlas, with photographs reproduced by the autotype process, and the manner in which the whole has been "got up" is certainly worthy of the important discoveries to which they refer.

Other travellers, and especially Messrs. Stephens & Catherwood, have also written of the Copan ruins, and all agree that the most interesting are the sculptured obelisks or monoliths, of which five are represented by plaster casts in the Museum. Three of these are elaborately carved, and each bears on its front a long-robed human figure, standing full-faced in a stiff and conventional attitude, with profuse head-gear; the sides and back of the monuments being covered with tables of hieroglyphics. The fourth has a human figure both back and front, with heads represented on its sides, whilst the fifth is covered with hieroglyphics on all sides. The human figures alluded to have been described as priests in pontifical robes; but evidence is not wanting to show that they represent gods; some which were found certainly look like idols. Nobody has yet succeeded in unravelling the meaning of the hieroglyphics, which are found not only on the monoliths, but on the altars and some of the tablets. Mr. Maudslay says* that the "tables of hieroglyphs should be read in double columns from left to right and from top to bottom. . . . . One of the most interesting points which I have noticed is that all the inscriptions which I have reason to believe are complete from the commencement are headed by what I shall call an initial scroll (the type of which is permanent throughout many variations), and begin with the same formula, usually extending through six squares of hieroglyphic writing, the sixth square, or sometimes the latter half of the sixth square, being a human face, usually in profile, enclosed in a frame or cartouche."

Four blocks from Copan, which are believed to be altars, are exhibited in the Museum. The carvings on the sides of one of these represent men in an Eastern-looking head-dress, the majority of whom are sitting cross-legged on small tablets of hieroglyphs, a position which, to judge from similar carvings in the other stonework, seems to have a peculiar significance. In this connexion we may call attention to the face of a step found in a temple, the original of which is also seen in the Museum. It may be noted that none of the seated figures are exactly in the same posture, some have one foot on the ground holding a scroll or other object in one hand and having the arm raised in the air or resting by the side, and each figure possesses different details on the head-gear so that the monotony of the whole is somewhat relieved.

The plaster cast of a seat, the original sculptures of several heads, the body of a "singing girl," and a foot showing thongs passing between two of the toes and fastened round the ankle by a buckle, all of which were found amongst the ruins, are also exhibited.

Before the survey of Copan was commenced, the whole site was covered with forest trees or an almost impenetrable scrub, and it was found necessary to clear a great part of this growth away before any idea of the place could be obtained. The monuments had also to be cleaned down, the superfluous moss and vegetation having to be removed before casts could be taken. Without going much into details, it may be mentioned that the structures met with during the course of the excavations were composed of a rubble of stones and earth, faced with well-laid masonry. It was shown that the pyramidal structures were almost in every case the raised foundations which supported roofed buildings,—probably temples,—which were approached by steep flights of steps; the buildings were most profusely ornamented with sculpture. To give some idea of the character of this work, Mr. Maudslay illustrates an elaborate doorway leading to an inner chamber of a temple, and also sundry fragments and figures from other positions which are highly instructive. Speaking of the doorway he says that there are in this design good examples of two marked characteristics of all American sculpture, namely, the inability of the artist to leave plain surfaces alone, and the love of introducing grotesque faces or scroll-work derived from them into the ornamentation of details.

The smaller mounds shown on the model referred to in the Museum are the remains of what were probably dwelling-houses. All were stone-roofed, and the "system of roofing here used (as in almost all ancient American buildings) was what may be called the horizontal arch." The age of these buildings is extremely doubtful. Certain authors are of opinion that they were erected and used by the Indians at the time of the Spanish discovery and conquest of the country, but it seems that there is very little to support this view. The doings of the Spanish conquerors are fairly well known through the writings of Cortez, Bernal Dias, and others, who either mentioned or described important places. No mention is made of any important city at or near Copan, and the Indians in the vicinity were not advanced enough in the arts of civilisation to have executed such works. We think there can be no doubt that the civilisations which produced the buildings and sculptures at Copan, and in all similar ancient pueblos in Guatemala, Honduras, and Yucatan, had passed away long prior to the Spanish conquest. If they were in a flourishing condition in the time of Cortez, he would certainly have mentioned them, as he gives such good accounts of his different journeys.

The largest obelisk represented in the collection at the South Kensington Museum comes from Quirigua, and does not materially differ from those described from Copan,

* "Proc. Roy. Geog. Soc.," *op. cit.* p. 593.

having the conventional erect human figures, one on both back and front, the sides of the monument being covered with hieroglyphs. A large, rudely-carved tablet, showing a seated human figure holding a bowl with an animal's head in it, comes from the same place.

There are also some tablets, carved in relief, in excellent condition, from ruins on the bank of the Usumacinta river, Mexico, which forms the boundary of the province of Tabasco and the Republic of Guatemala. Some of these represent a serpent with a human head rising out of a bowl and leaning over a man crouched or sitting on his haunches. The serpent plays a conspicuous part in many of these ancient Central American works, and by means of such symbols, together with the numerous picture writings and strings and tables of more or less picturesque hieroglyphs, we may some day be able to learn more concerning the remarkable people who made them. The indefatigable manner in which Mr. Maudslay has photographed and had plaster casts made of all the best-preserved or striking hieroglyphs on the spot, in spite of the many dangers he has encountered, is deserving of the highest praise. We may mention that he has also presented a series of the plaster casts to the Archæological Museum at Cambridge.

NOTES.

THE Royal Academy, we are glad to see, has recognised Architecture in its last election of Associates, and added an able and cultivated gentleman to its numbers in the election of Mr. T. G. Jackson. That Mr. Jackson should be the next choice whenever a new Architect Associate was elected must have been considered for some time past a foregone conclusion, and we have only wondered that the honour should not have been offered earlier to an architect whose claims to it were so indisputable. The other Associates elected are Mr. Stanhope Forbes and Mr. Harry Bates, and both of these elections will also, we think, meet with general approval. Mr. Stanhope Forbes may be considered to be *facile princeps* among the younger school of painters of *genre*, to use a hackneyed term which seems, however, hardly adequate to indicate a class of paintings which combine so much admirable delineation of character with so much of moral feeling and purpose. Mr. Harry Bates, on the other hand, is an artist pure and simple, who uses sculpture as a form of poetic expression, sometimes in telling again an antique legend, sometimes in the mere expression of energy and grandeur of line and modelling, as in his powerful group of "Hounds in leash."* There can be no question of his claim to the honour; but we regret that in doing justice to some of the younger sculptors of the day the Academy has so persistently passed over an older claimant, Mr. G. A. Lawson, whose works have exhibited qualities both of design and conception which have not received the recognition they merit.

AN article in the current number of the *Quarterly Review*, on "The Water Supply of London," is obviously written in the interests of the Water Companies. The object is to show that the Thames can be relied on for everything; that the objection to the use of the Thames on the ground of pollution of the water is without foundation, and that the water supply of London can be better provided by private enterprise than by any public body. That the complaints sometimes made as to the character of the water at present supplied to London have often been grossly exaggerated is perfectly true, and it is equally true that the Companies have improved the supply very much in the course of their existence, and have in fact done their best for the public in regard to the quality of the supply, whatever may be thought as to their tactics in regard to their commercial dealings with their customers. To maintain, however, the advisability of trusting to open rivers for water-supply is to ignore the increasingly pronounced opinion of the medical profession generally; while in considering the capacity of the Thames to maintain an adequate supply for London the *Quarterly Review* quietly ignores altogether the fact that the river, *qud* river, is in process of being ruined by even the present amount of abstraction from its stream; let alone what further raids may be made upon it by a constantly-increasing demand. The *Quarterly Review* refers complacently to the testimony of the late Mr. John Harrison in regard to "other additions that might be obtained, if necessary, within the locality." If the writer of the article had been present at the meetings of the Institution of Civil Engineers a few months ago, when Mr. Harrison's propositions were discussed, he would perhaps scarcely have had the hardihood to cite an authority whose proposals and arguments were so completely and almost contemptuously disposed of as were Mr. Harrison's on that occasion. The scheme for storage reservoirs in connexion with the upper portions of the Thames is advanced again as a solution of the difficulty, with a convenient forgetfulness of the fact that reservoirs in such a position (the only possible position if they are to supply by gravitation) must allow the great bulk of flood water to escape, while they must utterly ruin the upper portion of the Thames as a river. The bias of the whole article, in supporting the water companies through thick and thin, and ignoring every scheme that might be supposed to be in opposition to their interests, is so obvious as to be almost ludicrous; but such an article may do a great deal of harm in influencing the large majority of readers who know nothing of the subject, and who fondly imagine that a paper of this kind in a review of long standing is to be taken as an impartial discussion of the subject. Probably the editor of the *Quarterly Review* is no better informed on the subject than the bulk of his readers; but the appearance of an article in this style of manifest advocacy, on a subject which especially demands, in the public interest, a purely impartial and scientific treatment, is not creditable to a review of the standing and position of the *Quarterly*.

THE present epidemic of influenza draws attention to the great desirability of every house in the country, and every large house in town, having a large room or rooms isolated as far as possible, and capable of being used as a sanatorium. In every large family there is always liability to infectious diseases, and if there is a part of the building which can be used with success as a sanatorium, it is, undoubtedly, a safeguard against the spread of disease, and a great convenience to all concerned. In small houses this kind of isolation is practically impossible; but this fact again compels attention to the want in London of hospitals for the use of those who can pay for them,—not in cases of accident, but in cases of disease, especially of an infectious character. There is an idea that a hospital of such a kind is a danger to the community; on the contrary, by concentrating sick persons in a proper building, and removing them from private houses, much of the risk of the spread of disease is removed. We are thus brought face to face with another consideration, viz., whether such hospitals should be erected and managed by the governing bodies of localities? Some day they will certainly form one of the types of buildings necessary in any well-organised social community.

IT is curious how long a monument of first-rate importance may lie *perdu* in an archæological collection of long standing, apparently just because the collection itself is so well known that the novelty hunter passes it lightly by. A terra-cotta relief, just published in the last issue of the Roman section of the *Mittheilungen* of the German Archæological Institute (vi. 3), well illustrates this point. Dr. Studniczka has discovered in the well-known Santangelo collection of the Naples Museum, hidden in a mass of terra-cotta lamps of Græco-Roman date, an archaic relief, curious and important, both for subject and treatment. The relief, of which about a fourth at either end is unfortunately broken off, represents a female *Xoanon* of the most archaic type. The figure is standing erect, with hands stiffly dependent at each side. The right hand held some uncertain attribute; but the remarkable point about the figure is the elaborate decoration of the formal, foldless robe. It is divided into three parallel friezes. In the topmost of these is depicted, in the well-known type, Ajax carrying the body of Achilles. In the second frieze a *choros* of women are dancing hand-in-hand; in the third a similar *choros* of men. Clearly we have here the copy of a cultus image wearing a ceremonial robe, just such a robe as was woven for the Panathenaic Athene. Dr. Studniczka's paper should be read by all those interested in archaic art. In the same number of the *Mittheilungen* is published a charming little bronze, which its owner, a dealer in Rome, lent to Dr. Petersen for the purpose. The bronze represents a boy, stooping, with a hand firmly planted on each knee and his feet somewhat widely apart. The meaning is made clear by a vase in the British Museum (recently published by Mr. A. H. Smith, in the "Journal of Hellenic Studies," 1890, plate xii., p. 279). Here a family of Satyrs are playing a sort of modified form of leap-frog—the leaper, instead of clearing the Satyr who is "giving him a back," descends on his shoulders, and there remains. Examined by the light of this vase, the outline of the bronze becomes clear, and to make things yet more satisfactory, traces of a figure now broken off are observable on the boy's shoulders. It is an interesting instance of the light thrown by vase-paintings on sculptural art, as well as a pleasant glimpse into the boy-life of antiquity. The boy who carried the other was called, we learn from Pollux, the "donkey," and he was sometimes made to fill the post by way of "forfeit."

ADVERTING to two of our "Notes" of the 16th and 23rd instant, we are sorry to find that an attack of influenza incapacitates Miss Sellers from continuing, for the present, her class at the British Museum. Last Tuesday Miss Millington-Lathbury, upon very short notice, took her colleague's place, and gave her opening lecture upon the daily life and thought of the Greeks, dealing, from an archæological standpoint chiefly, with their temples, ritual, and religious cult. Showing, firstly, how the king-priest, as priest-king, had his counterpart in the head of even the smallest or meanest household, the lecturer dwelt upon the political solidity which grew out of the religious ceremonies of the Greeks, and explained how these,—which, however simple or complex, they always exactly observed,—expressed conceptions of a deity whom they at first saw in every natural thing, and went on to set up as a god, humanwise, of something—a god to be propitiated and dreaded, and on occasion, as we know, to be cajoled. Thus they passed from animism to an at once elevated and debased anthropomorphism. The temple of such a deity was not, Eleusis excepted, a resort for worshippers or suppliants: it was his secluded dwelling-place and treasury; the altar, whether there or at their own homes, formed the point around which the cult concentrated, and on the altar they made sacrifices of expiation or appeasement, with an underlying idea that the deity should partake of their cheer, hospitably offered. Then, with the aid of plans, Miss Millington-Lathbury traced the temple's growth. The pristine wooden hut yielded to one of brick or clay, and that to the stone-built cella, though it seems that wood was never quite discarded; yet with its successive accre-

* Illustrated in the *Builder* for June 6, 1891.

tions of portico, *πρόναος* and *ὀπισθόδομος*, until they attained to the dipteral Olympieium itself, the whole *ἱερόν* was but a fort or stronghold for the cella (*ναός*, or *σηκός*), wherein the god abode. And here it occurred to us that the difference between the old religion and the new might be briefly illustrated by contrasting the templum, or *τέμενος*, or hedged-in enclosure, wherefrom, save in a few instances, the dead, and many of the living, were excluded, with our church, or *τὸ κυριακόν*, the Lord's house, in which all alike gather for praise and prayer. We may add that in regard to the lighting of Grecian temples the lecturer expressed accord with Dr. Dörpfeld's opinion, on which we recently commented.

THE restoration,—or, rather, re-erection,—of the monument of Queen Eleanor in Lincoln Minster, unveiled recently, is noteworthy as being the munificent gift of a leading Nonconformist to the cathedral of the city of his adoption. The monument takes the place of that erected by Edward I. over the portions of his consort's body removed in the process of embalming, which, though on a somewhat smaller scale, was in all essential features a *replica* of that placed over her grave in Westminster Abbey. The priceless "Hatton MS." belonging to Lord Winchilsea, and deposited temporarily by him at the rooms of the Society of Antiquaries for inspection, among the many drawings of sepulchral memorials in our cathedrals and great churches, taken under the direction of Sir W. Dugdale before the outbreak of the Great Rebellion, contains a careful representation of this monument, which, aided by the Westminster tomb, has served as a guide to Mr. Pearson and Mr. Nicholls in their restoration of the tomb and effigy. The effigy of the Queen, which was cast by Mr. Singer, of Frome, is executed in gilt bronze; the altar tomb, on which the effigy reposes, of dove-coloured Hopton-Wood stone, contrasts well with the subdued brilliancy of the effigy. The sides of the tomb are decorated, as at Westminster, with shallow canopied recesses containing shields with the armorial bearings of England, Castile and Leon, and Ponthieu, dependent from bunches of natural foliage,—oak, vine, and maple. The carving of these, as well as of the crockets of the canopies and the other decorative work, is admirable. Mr. Pearson may be congratulated on the success, from one point of view, of a somewhat difficult undertaking. Whether this re-making of approximate copies of lost monuments is a process altogether worth the pains and cost expended on it, may however be a question.

A COMMITTEE of those interested in architecture and the various artistic crafts, such as decorative painting, wood and stone carving, metal working, &c., has been formed in Edinburgh. Dr. Rowand Anderson, President of the Committee, in an address to the Edinburgh Trades' Council on the subject last week, said:—The kind of technical education they proposed was the teaching of the eye and the hand to work in harmony and sympathy with one another, and of the judgment and imagination to invest all handicraft work with intelligence, purpose, and grace. For this purpose they would require 2,000*l.*, and 1,567*l.* had already been received or promised. Funds would also be required for travelling and other scholarships. The sanction of the Secretary for Scotland had been obtained for the use of the rooms in the Royal Institution formerly occupied as an antiquarian museum. It was intended that the classes should be managed by a representative Committee and a Committee of the Board of Manufactures, and that they should be conducted by men of eminence. At present, work requiring an artist had too often to be left out of consideration, or when art was required, workmen had too often to be brought from elsewhere, or the work sent out of the country. There was, he argued, no reason why Edinburgh should not be a centre of art.

THE Official Examiners have passed the Bill for enabling the trustees to borrow 100,000*l.* for an enlargement, with improvements, of the Borough Market, one of the oldest in London. In 1290 a number of stalls were cleared away from London Bridge; and for a long period, as we gather from Dr. Rendle's communication to *Notes and Queries* of December 17, 1887, the market was carried on within the precincts of (old) St. Thomas's Hospital, or at St. Margaret's Church-gate, and then in Long Southwark, as they called the main street between the church (its site being that of Town Hall-chambers), near the Tabard Inn, and the bridge-foot. In its midst stood a cage and pillory, with whipping-posts near at hand. Booths and stalls, too, seem to have been placed in the churchyard. In Stow's time they sold leather on St. Margaret's-hill, and the church, "being put down," served for a compter, or jail, as well as for courts of assize and the Admiralty. Under an Act of 1756 the Local Authorities suppressed the traffic; a subsequent enactment set up the market again, in the Triangle at the back of Three Crown-court, and near to Foul-lane and Rochester-yard: a site anciently known as Grimes Croft, which William, second Earl Warren, had granted to the monks of Rochester. There stood Rochester House, an "inn" of the Bishops of that See, and pulled down in 1604. Fifty years ago they extended the market area by demolishing St. Saviour's Grammar School, which Thomas Cure, Queen's saddler, and a great benefactor to the parish, had, with others, founded in 1562, and to which Queen Elizabeth gave a charter of incorporation. The old school buildings, on the site of the prior's house, south of St. Mary Overie's, were rebuilt after the great fire, which devastated this part of Southwark in May, 1676;* the new buildings were erected, 1838, after the designs of Mr. Christopher Edmonds, architect, on land given by Dr. Sumner, Bishop of Winchester, in the street bearing his name. In 1885 Mr. McIntyre North, architect, prepared plans for a proposed increase of this market, by taking in more ground between Borough High-street and Messrs. Barclay & Perkins' brewery, Park-street, at an estimated cost of about 65,000*l.* The annual profit, arising from the sale of mostly fruit and vegetables, was then assessed at nearly 7,000*l.* Rebuilt in 1686, the Town Hall was pulled down in 1793, and its statue of King Charles II. re-erected in Three Crown-court, where—as at King's Cross—the pedestal served for a watch-house and lock-up.

THE great height of buildings in America is beginning to make the fire insurance companies uneasy. It appears that the Chicago Fire Underwriters' Association, which includes all American and foreign companies doing insurance business in America, with one exception, has decided that all office buildings of non-combustible description should be limited in height to not more than one and a-half times the width of the street. It further appears that this important association regards many of the so-called non-combustible buildings as practically unsafe from their great height. There is no doubt that high buildings are one of the dangers of modern city life,—a danger which will probably increase rather than decrease. The United States would have to pass a general Act of Congress on this point if they wish to have uniformity and safety; but the subject is one of those which by the constitution is essentially one which must be dealt with by each State according to its own views.

IN a letter in the *Times* of the 26th, in regard to the ventilation of the House of Commons, Sir Douglas Galton gives a description of the "wet screen" in use at the Victoria Infirmary at Glasgow for the removal of dirt and fog from the air previously to its entering a building. He gives the following description of the process:—

"In this infirmary the air is renewed six times an hour. This volume of air before it enters the wards is filtered and washed by being passed through an air-washing screen of cords, formed of horse-hair and hemp, closely wound over a top rail of wood and under the bottom rail, forming a close screen, 16 ft. long by 12 ft. high, affording nearly 200 square feet of surface. There is a constant trickling of water down this screen, by which it is kept wet, and the air, in filtering through it, has the dust and soot particles removed, and when once these have adhered to the wetted surfaces a current of air of considerable velocity will not carry them through the screen, but the falling water floats them down into the drain. An automatic flushing-tank is fixed in a position whereby twenty gallons of water is instantaneously discharged over the surface of the screen every hour, to flush and remove any accumulation of wetted dust, soot, or germs which may not be removed from the screen by the trickling water over its surface."

Sir Douglas Galton recommends this method as one which, among other advantages, will keep fog from entering into the ventilating chambers and hence into the building, and states that on very foggy days the air within the Infirmary was perfectly clear and pure.

THE recent litigation in regard to certain patents, in which Messrs. Nettlefold, Limited, were plaintiffs, in which the hearing of the case lasted for a number of days before Mr. Justice Romer, has drawn public attention to the trial of patent actions. We have more than once pointed out that the Judge on these occasions should be assisted by skilled assessors. It is impossible for a lawyer, however able, to be capable of grasping a number of technical details in a moment. The result is that a great deal of groping in the dark goes on. Counsel become prolix, and scientific witnesses enter too much into minutiæ. If the Judge had scientific men sitting with him he would feel strong in their assistance, and the cause could be tried with much greater quickness. It is sometimes said that these patent cases, and building and engineering cases, should be tried by a special Judge. We can see no reason for this if the Court is assisted by skilled assessors. At the same time, if one Judge had the entire management of patent litigation, and was also assisted by assessors, there is no doubt that this would be an important legal reform. But a minor and useful one would be for any Judge to be able to summon assessors in special cases which require scientific knowledge.

IN certain districts of North Germany some of the water-supply contains as much iron as to render it quite unfit for transmission through pipes for domestic purposes. The iron usually takes the form of a ferro-carbonate, which is held in solution by free carbonic acid, although a small proportion may exist as ferro-phosphate. Ammonia is almost invariably present, and there is often a considerable amount of chlorine. Mr. B. Proskauer, in *Zeitschrift fuer Hygiene*, has given the results of investigations into this subject, the above facts being taken from his analyses of the deep-well water of the Berlin district. In the well water of the North German plains a notable feature is the considerable quantity of sulphuretted hydrogen, which, however, is given off on exposure to the atmosphere. Ammonia, sulphuretted hydrogen, and chlorine characterise the waters of thinly-inhabited districts, as well as those thickly populated, from which it is concluded that the contamination does not owe its origin to sewage. In order to overcome these defects, a course of treatment by exposure to the atmosphere has been followed. This leads to the iron becoming separated from the water and deposited,—a fact which is attributed to combination with oxygen, and the consequent formation of insoluble compounds. Several ways have been tried by which the aëration of the water might be effected, but this does not appear to be so easy as would at first be thought. For this reason the Potsdam supply proved a failure, not through the unwhole-

* See the woodcut in the *Mirror*, April 18, 1840. Here Dr. Heberden, and John Harvard, founder of Harvard, U.S.A., are believed to have been educated.

someness of the water, but through the choking of the pipes. Large volumes of air were pumped in, and the water was also mixed with purer water from Lake Tegel. By the light of further experiment, it was concluded that by throwing the water in a series of cascades, and afterwards filtering, the difficulty could be got over. In the Berlin waterworks, Mr. Oesten, the Engineer, has devised an apparatus by which the water is made to pass in fine streams through a distance of about 6 ft., and it is then passed through a filter. It is said that with this process of aëration, filtration can safely be performed at three times the speed of ordinary filter-beds used for purifying surface-water.

IN a paper read before the Dresden Society of Engineers and Architects, some particulars have been given of the regulations in force with regard to the hygienic conditions of railway carriages on the Prussian State railways. The amount of air-space in the compartments required per passenger is 68, 46, and 30 cubic feet for first-class, second-class, and third-class carriages respectively. The average percentage of passengers being only 24·6 per cent. of the available seats, the amount of air-space actually provided is approximately four times as great as that above stated. The amount of ventilation required, in order to limit the percentage of carbonic acid in the air of a railway compartment to one-tenth per cent., varies between 750 and 1,360 cubic feet per hour per passenger. Herr Pfuelzner, the author of the paper referred to, considers it hardly possible to obtain so vigorous a ventilation without producing draughts. In England it would seem as if we had solved the paradox of producing draught without any ventilation at all, so draughty to the legs and feet, and so stuffy may be the upper part of a carriage; though in rolling-stock fitted with "torpedoes" there is a great improvement in this respect. The author of the paper objects to stoves for heating as being dangerous, preferring steam-pipes under the seats, but below the level of the floor. Carriages with iron or steel under-frames, he states, are more noisy than those with under-frames of wood. On the other hand, spoke-wheels are less noisy than solid disc wheels, but the former produce more dust.

THE Electrical Exhibition at the Crystal Palace is still far from complete, though it has now been opened for nearly three weeks. In the South Gallery most of the stalls are still empty, and some elaborately-furnished rooms are lighted by a line of gas-jets a few feet from the floor. The catalogue has reached a second edition, though still stated to be "under revision." The plans of the Exhibition in this edition are on a larger scale, but the general arrangement of the book is unaltered, and it still tells us that the Board of Trade unit is 1,000 watts per hour, or watt-hours, as though the expressions were equivalent. The machine-room is open, and the exhibits in it fairly complete, as also are most of those in the nave. Amongst these latter, some of the most generally interesting are the portable lamps and the apparatus for heating and cooking by electricity. In the Gallery, Mr. Harness collects a crowd to receive shocks from a person on an insulated stand, who is charged by means of a large influence machine—a time-worn experiment that seems never to lose its charm.

THE Committee of the Whitworth Institute have taken a very unusual course in relation to the competition for designs for the proposed building (the result of which is briefly noticed in our "Competitions" column), in admitting competitors only to the exhibition of the drawings, and refusing to admit the representative of an architectural journal, or (we presume) of any paper, to inspect and criticise the designs. The matter is of no consequence to us, but we do not think the arrangement will be satisfactory to competitors, who wish an award in an important competition to be open to public criticism; and the reasons given for it appear to indicate that the committee are under a misapprehension as to the nature of the interest which architectural journals and their readers take in a matter of this kind. The committee are apparently committed to some change of policy in the matter, and do not wish any public clue to be given as to what they have intended or now intend. We care nothing whatever about their policy; the matter to our readers is simply a consideration of the manner in which a given architectural problem has been treated in regard to plan and design, with the further interest to competitors that they may wish to have the award independently criticised, if there should be anything open to criticism in connexion with it. We may point out also to the Committee that it would of course be perfectly easy, for any journal which chose to adopt such a method, to get a competitor to write an account of the designs. We expect to find that this has been done, and in that case all the committee will have got by their scrupulous adherence to official privacy will be the publication of descriptions written by interested persons, instead of by perfectly independent critics who have no interest of their own to serve.

SARACENIC ARCHITECTURE.*

BY PROFESSOR AITCHISON, A.R.A.

IF the saying of Sir Joshua Reynolds be true "that it is by being conversant with the inventions of others that we learn to invent," I want no further excuse for speaking of Saracenic architecture.

The vulgar reproach addressed to architects is that they do not invent a new style, while the Saracens certainly did, which, in its developed form, no one can mistake. Those who reproach architects with not inventing a new style forget that hundreds of years are required to evolve one, and that one of the conditions of its evolution is that the people should appreciate and admire the new grafts on the old stock.

The architects of the early Saracen monuments were probably Byzantine, or if not they were natives of the countries the Saracens conquered. When the Saracens began to have a style it would be interesting to know on what former style it was founded, and of what nationality the architects were who made the first steps forward. It would, however, be a hopeless task to trace their genealogy, as polygamy then prevailed, even if we knew their names, and few of their names are known, so we must be content to call that architecture Saracenic that flourished in countries under the rule of the Caliphs, unless we know to the contrary.

I was curious to learn what architectural art the Saracens brought with them from their native land, but if they had any, it seems impossible to ascertain what it was. Mecca is said to have been built with stone cut from the granite mountains that surround it, but I had never seen even a photograph of it, until Mr. Carpenter lent me these a few days ago. The Kaaba, or great Temple of the Arabs, supposed to have been built by Abraham, existed in Mohammed's time, and was rebuilt when he was a man of thirty-five, after being ruined by a flood. We know that its walls were then taken down to the footings, and rebuilt to a height of 4 ft. or 5 ft. with pieces of grey granite from the adjoining mountains, and that at this point the black stone was carried to it in Mohammed's Cloak by a man holding each corner, and that each of the men belonged to one of the four divisions or tribes of Mecca. It was fixed in the south-east angle by Mohammed himself. What the upper part of the Kaaba was made of we do not know. A Greek or a Byzantine ship had been wrecked at the time of the rebuilding, on the neighbouring shore of the Red Sea. The Koreish bought the timber of the vessel, and employed the captain, named Bacûm, who was skilled in architecture, to assist in the rebuilding of the Kaaba, and it was roofed with sixteen rafters or joists, resting on six central pillars. The Kaaba was originally covered with cloth that hung like a curtain on all sides, and was its only roof, *i.e.*, it was an hypæthral temple, until this wooden roof was made by Bacûm; it was subsequently enlarged by the Caliphs Omar, Othman, Ibn-Zobeir, and Abd-al-Melik, afterwards by the Sultans of Egypt, and its present form dates from the work of the Sultan of Turkey, Amurath III., in 1576, in our Queen Elizabeth's reign. On the east side, about 6 ft. from the corner of the black stone, was a door 6 ft. or 7 ft. from the ground, and entrance could only be got by a set of steps on wheels being rolled up to it.

It is not quite clear whether the idol Hobal, of red agate, was inside the Kaaba or outside. The Kaaba must, I fancy, have been mainly of wood, as it is said to have been burnt down in Yezid I. and Abd-al-Melik's time, but it may have been that the curtains caught fire and burnt the roof, the curtains or coverings in Omar's time were of linen, and afterwards of silk and cotton brocade, attached to the walls, and till the time of the Abbassides the new coverings were put over the old ones. There was a celebrated temple in Arabia, mentioned by Diodorus Siculus about 8 B.C. (Lib. 3, cap. 3):—"The people that inhabit these parts are called Bizomenians, and live upon wild beasts taken in hunting. Here's a sacred temple in high veneration among all the Arabians;" but whether it was the Kaaba or not I am unable to say, though it is believed to have been, as there was no other celebrated temple in Arabia. The Kaaba is now said to be an irregular oblong in plan, about 50 ft. by 40 ft.

It is stated that in Mohammed's time, an aqueduct was tried to be built from Mount Arafat, but without success, so the Saracens of his day were evidently not great builders; although there were Christians, Jews, Abyssinians, and Persians among them. Mohammed, it is true, had a mosque built at Medina when he settled there, but it is believed to have been mainly of wood, with wooden columns; his wives' houses, that formed the east side of the enclosure of the mosque, were of unburnt bricks, with partitions of wattle and dab. Mohammed had no house of his own, but lived with his wives in turn; he, however, speaks of columns and arched vaults in the Koran (cap. 104); and a splendid tomb, with a cupola, is said to have been built over his grave, but of what material we know not. His tomb was built in Ayesha's house, at the spot where he died, and the tombs of the two succeeding Caliphs were also erected there.

The Saracens were of three sorts,—(1) Wandering tribes of herdsmen or nomads, who, as Aristotle says ("Politics," Lib. I., cap. 8), combined brigandage with it for convenience; (2) those who lived in towns and tilled the land, as the people of Medina; but husbandmen were looked down on by the wandering and by the trading people; and (3) those who were carriers and merchants, like the people of Mecca, all of them seem to have found it convenient to add brigandage to their other occupations; one of the principal quarrels between the people of Mecca and Medina, after Mohammed settled there, was the marauding expeditions he ordered against their caravans.

The Meccans looked upon themselves as the people of most capitals do, and the tribe whose head men had the care of the Kaaba, and the well of Zem-Zem, the Koreish, considered themselves as by far the most important tribe, looked down on the rest, and held the wandering Arabs in contempt; but, unfortunately for the continuance of Saracen sway, the wandering Arabs equally despised husbandmen and merchants. After their first foreign conquests, the leading families of this tribe of Mecca were called the Princes of the Koreish, and Mohammed was of this tribe. The east coast of Arabia was a convenient landing-place for the products of Persia, India, and the far East, as well as for those of the east and south coasts of Africa; while the ports on the Red Sea were possibly used for the exchange of the products of the East with those of Europe, Asia Minor, Syria, and the North Coast of Africa; though in old times all the main trade routes were land routes, and the whole Saracen Nation was at one time engaged in carrying. This business was greatly interfered with by the Romans discovering the passage to the East by the Red Sea, through the Straits of Bab-el-Mandeb, "The Gate of Tears," and was the probable cause of the large migration of Arabs to the

* Being the first Royal Academy Lecture on Architecture this session. Delivered on Monday evening, January 25.

North of Syria, but caravans still went to Palestine and Syria, as Mohammed accompanied his uncle Abu Talib there, and it is said that one caravan in Mohammed's time went to the Court of Cosroes, the King of Persia. Even as late as the first three Caliphs, there was great reluctance shown by them to let their people trust to the dangers of the sea. Arabia itself is said to produce frankincense and other gums, —gum-arabic, for instance,—manna, and odoriferous herbs, we have all heard of "the perfumes of Arabia." It also contained precious stones, the onyx, the ruby, and the Mocha stone, and pearls were found in the Persian Gulf. Coffee was not then discovered, and it is doubtful if the lead mines were worked; silver and gold were said to be found there, but as Arabia was an emporium, it is only from modern travellers that we can judge of what it produces, as the old writers spoke of all the things that came from Arabia as native products, hence its ancient reputation for wealth.

Although architecture has perhaps no direct connexion with any form of belief, still temples have mostly been the greatest works that architects have created, and each particular belief has greatly influenced the adornments bound up with the architecture; so I think it necessary to say something of the new religion of the Saracens, for it welded for a time a set of hostile tribes into a nation, and sent them forth to conquer all the countries of the ancient world; it thus caused the creation of mosques, and probably the modification of the plans of other buildings, and of ornament, the latter through the exclusion of animal life.

Before Mohammed published the Korân, and declared himself the last prophet of God, the Arabs were mostly idolators, though some had embraced Judaism or Christianity; the idolators mostly worshipped the host of Heaven, or some particular gods or goddesses, and did not believe in another life; this time of idolatry was afterwards called by them,—"the days of ignorance."

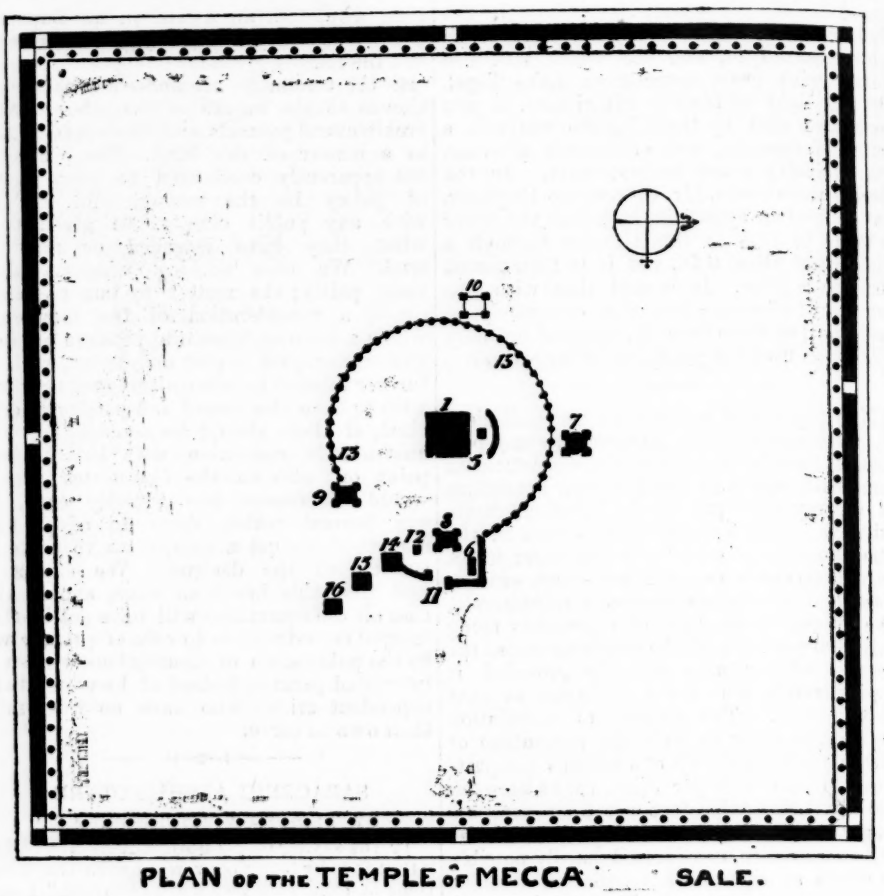
The Kaaba at Mecca was the great temple of Arabia, to which all the tribes came once, and sometimes twice, a-year to worship and to sacrifice, and these were called the greater and less pilgrimages. The four months kept sacred from war were devoted to the time occupied in making the pilgrimages, the sacrifices, and the religious exercises.

In the enclosures round the Kaaba were 360 idols, including the black stone, probably a meteorolite, said by modern travellers to be roughly hemispherical, about 6 in. high and 8 in. in diameter, and of a reddish-black colour.

During the time of the pilgrimage a fair was held at Mecca; Mecca itself was in a barren valley that produced nothing, so that two caravans a year had to bring the Meccans the staple articles of food, besides what they got from the environs. The pilgrimage of people from all parts of Arabia to the Kaaba, and this fair greatly enriched the inhabitants.

The condition and habits of the Arabs in the days of ignorance were thus described by a new convert to Islâm:—"The men who had clothes had generally a garment of camel's hair, besides the turban; fed on fruits, parched grain, broiled snakes and lizards, and drank brackish water, killed anyone they could who was worth robbing, and buried alive all their superfluous female children. Their courage, ferocity, and bloodthirstiness were probably unparalleled, until the turn of the Tartars came; they were probably not more inhuman and perfidious than other savages, and, as Cetywayo said of the negroes, could only be governed by killing large numbers of them. Hajjaj, the governor of Cufa and the East, is said to have put 120,000 persons to death, besides those slain in battle, by the time of his death, 95 A.H., 713 A.D. The Saracens were insubordinate, quarrelsome, vindictive, and revengeful to the last degree, and so fond of fighting that Kalid, their great general, called by Mohammed 'the Sword of God,' told the Persians that 'his men were as fond of death as they were of life,' and afterwards the Caliph Omar said:—'My people are as fond of fighting as the Christians are of eating swines' flesh and drinking wine.'"

The Arabs valued themselves on their eloquence and poetry, on their skill in horsemanship, and the use of arms; on their hospitality, and the number of their sons. Like all conquering nations, they were probably the strongest, most vigorous, and best-educated people then in the world, though few of them could read or write; they were frugal, mainly



PLAN OF THE TEMPLE OF MECCA. SALE.

References.

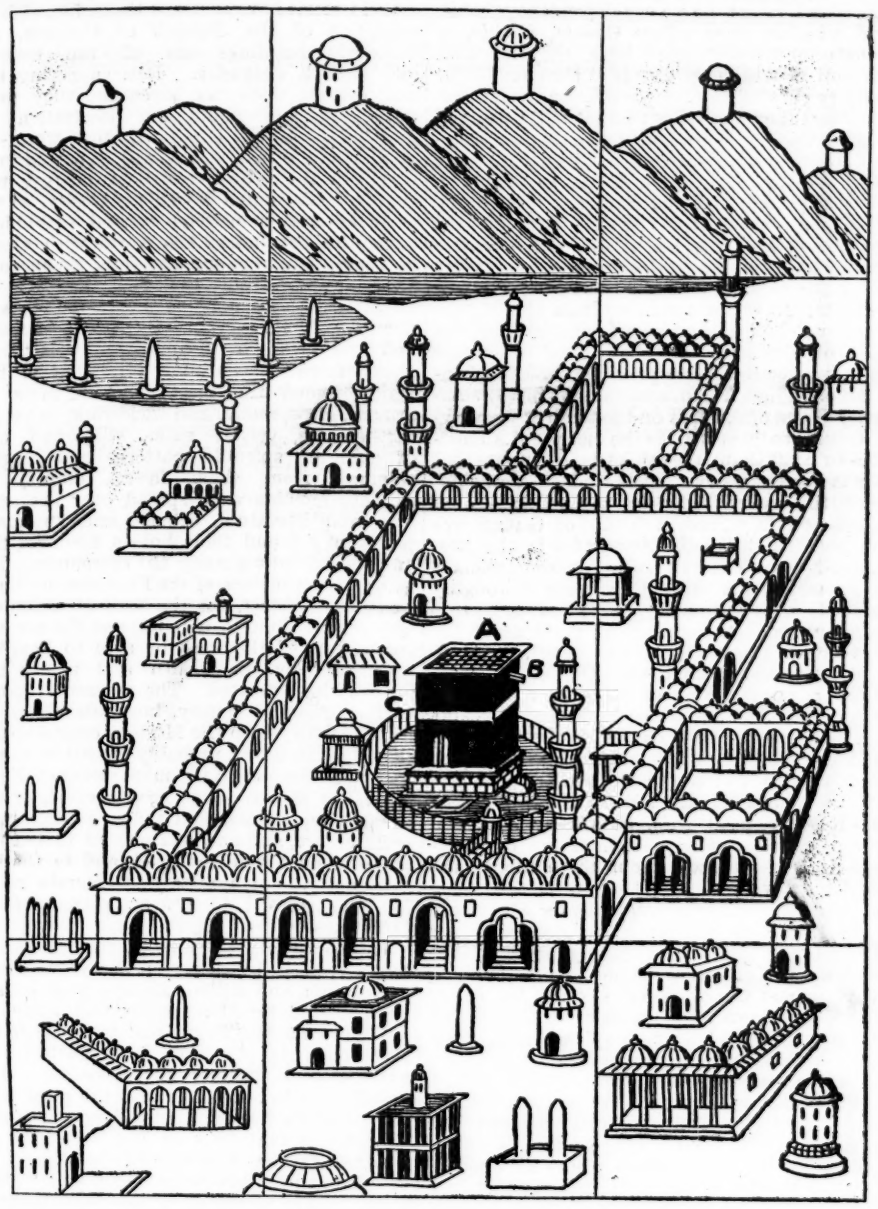
1. Al Kaaba.
5. Sepulchre of Ishmael.
6. The pulpit.
7. The station of the Hanifites.
8. The place of Abraham and the Shafeites.
9. Station of the Hanbalites.
10. Station of the Malekites.
11. The old gate.
12. The steps on wheels to mount up to door of Kaaba.
13. The inner enclosure.
14. The building over the well Zem-Zem.
15. The treasury.
16. The cupola of Al Abbas.

no doubt from necessity, hardy from constant exercise, and exposure, accustomed to endure the extremities of cold and heat, of hunger and thirst, and the terrors of solitude in a country infested with beasts of prey, keenly observant of the stars, and of every slight natural indication that would enable them to find their way over trackless deserts and pathless mountains, or to discover underground springs, and they had to practise every art and every device to preserve their lives amid hostile tribes, beasts of prey, and sand-storms. They were adepts in every ruse of savage warfare and were a constant terror to their neighbours from their incursions and robberies, but the reason they were not a menace to the adjoining potentates was that they had no cohesion, and were always quarrelling and fighting with one another, consequently, outside their own country, they never made any permanent head against the armies of the Kings of Persia, or the Byzantine Emperors, until after their conversion to Islâm.

It would be interesting to know what industrial arts they possessed in Mohammed's time: he said, there were five iron things that came down from heaven, the anvil, the tongs, the great and little hammer, and the needle. We know he cobbled his own shoes, that one of his wives tanned leather, that there were sword cutlers, that there was striped stuff called the cloth of Yemen, that they arched his grave over with unburnt bricks, and that the men possessed the art of dying their hair red.

Mohammed was the illiterate prophet who could neither read nor write, and propagated his faith without the aid of miracles. He believed that the Angel Gabriel repeated to him certain passages from an inscription by the throne of the Almighty, which, when completed, formed the Korân, but it must be observed that both at home and in his travels he had heard much of religions from Jews, Romish, and Orthodox monks, the Christians of Arabia and Abyssinia, from the Magians of Persia and possibly from the Buddhists, and he admittedly borrowed many of the stories in the Korân from the Old Testament, the Talmud, and the Apocryphal Gospels; he had been much struck by the preaching of Coss, Bishop of Najrân, had visited synagogues, Christian churches and shrines, and had observed the sacred pictures in the churches and abhorred them, so that he afterwards had the pictures in the Kaaba erased. I presume idolatry was so ingrained in the people that it was difficult to eradicate, for though he allowed chess playing, he looked with an evil eye on chessmen carved into figures.

The inspirations furnished him with a pure monotheistic creed, with a resurrection, a day of judgment, and an eternity of pleasure or pain, forbade idolatry and infanticide, and contained a few stories, a few moral, administrative, and ritual observances, and inculcated an ascetic life of prayer, fasting, and almsgiving. The inspirations also informed him that all martyrs went straight to paradise, and that those killed in battle against unbelievers were martyrs, and declared that he was the last prophet,—Adam, Noah, Abraham, Moses, and Jesus Christ being his precursors,—that their doctrines were superseded by his, and that there should be no priests or Monks. The short creed of Islâm is,—"There is no God but God, and Mohammed is his apostle." The Moslems call a prophet who is the author of a book an apostle. At first his inspirations were rather Christian in spirit, and his Kibla, or the line of prayer, was to the Temple of Jerusalem. After his first revelations he converted his elderly wife and his slave, afterwards a few relations and others, but, as he insisted on publicly preaching against idolatry, on the unity of the Creator, and that he was the prophet, he incurred the enmity of the people; he and his converts were persecuted, and, after escaping assassination on several occasions, his converts eventually fled to Medina, and were followed there by him and Abu Becker, the father of his wife, Ayesha; this was called the Hegira, or flight, and became, in the days of Omar, the Moslem era. It happened on June 20 or July 15 or 16, 622 A.D., and those who fled were called Mohajerin, or the flyers, and those who received him at Medina, the Ansars, or helpers. Some of his first inspirations were altered, and some were reversed at Medina, his Kibla was there changed to the Kaaba at Mecca,



Painted tile panel representing the Kaaba at Mecca (Palace at Esbekieh, Sixteenth Century).

A. The Kaaba. B. Golden Spout. C. Golden Band.

and the idolators, including his enemies, were not merely left for punishment in the next world, but were to profess Islâm or be extirpated in this; Jews and Christians, however, were to be tolerated on the payment of a tribute. One-fifth of all plunder taken by the believers was to go to the prophet for the support of the faith and for alms to the faithful, and there was also a tithe on all Moslems for the same purpose. I should say that, besides prohibiting infanticide, the Korân greatly improved the condition of women and orphans as regards their property and their treatment, though some say that the restriction of the freedom women enjoyed in the days of ignorance was not counterbalanced by the advantages they gained under the Korân.

The peculiar veneration that Mohammed's converts had for him went so far that they saved the water he washed in as something holy, and cherished as relics and talismans the hairs that fell from him. Sidi-Sahab, one of "the companions," was presented by Mohammed with three hairs from his beard when he was being shaved. These Sidi cherished, and after the "Apostle's" death he accompanied Ocba to Kairouan, where he died, and his instructions were that one of these hairs should be placed on his tongue, and one on each eye when he was buried, which was done. Mohammed's followers were also delighted by his consecrating the wells of drinking water by spitting into them. The alterations in the faith and ritual, the command to bring in the whole world to Islâm by the sword, together with his successful marauding expeditions, brought in many converts. A few battles with his enemies the Meccans, the destruction of the neighbouring Jews, and the apportioning their land among the refugees, brought in more, so that after a few years he summoned the Byzantine Emperor, the King of Abyssinia, the King of Persia, and the Jewish, Christians, and idolatrous tribes out of Arabia to be converted to Islam. On account of the murder of one of his messengers by Sharahbîl, the chief of an independent tribe, he despatched an army against him, but the Saracens were nearly cut to pieces at Muta by a Byzantine army, led by the brother of the Byzantine Emperor Heraclius, aided by the forces of Sharahbîl. The same year of the Hegira, in spite of this defeat, he was enabled to take Mecca, practically without resistance, though there was some slaughter in one quarter of the city, and to make the whole of the idolatrous inhabitants embrace Islâm, by that most cogent of all reasonings,—the sword; he then had all the idols in the Kaaba and its courts destroyed. It was then necessary to convert the rest of his idolatrous countrymen, and make them pay the tithe for the support of the faith, those that objected were butchered to the last man, and all the women and children sold for slaves.

In spite of Mohammed having become the prophet and absolute prince of the most warlike people in the world, he still kept to his frugal fare, his poor dress, and lived with his wives in their mean houses at Medina; he claimed nothing of his people beyond his share of the plunder, the tithe, and tribute, but absolute obedience, and an extra allowance of wives; the army being paid by the plunder they took.

On Mohammed's death at Medina in 11 A.H., 632 A.D., the converts outside Mecca and Medina mostly relapsed into idolatry, partly from habit and partly from their objecting to political subjection and to paying the tithe, but all the backsliders and recusants were either converted to Islâm or butchered in the reign of his successor, the Caliph Abu-Beker. When the whole of the natives were nominal believers, the Saracens were launched on Chaldæa and Syria, and in little more than a century they had not only conquered Persia, Khorasan, Afghanistan, Bokhara, Scind, and the Punjab, from the Indus to the feet of the Himalayas, and had penetrated to Samarcand and Kasgar, but they had also subjugated Mesopotamia, Syria, and Palestine, Egypt, and the north coast of Africa to the Atlantic, the greater part of Spain, the south-east of France, and had ravaged Asia Minor and the main islands of the Mediterranean, and besieged Constantinople.

Mohammed's immediate successors, the Caliphs Abu-Beker and Omar, imitated his frugality, simplicity of dress and living; but, as in Omar's day, the fifth of the plunder, the tithe and the tribute became enormous, he paid large stipends out of it to the early believers, thus creating a sort of superior nobility above those of the Koreish, which afterwards brought trouble, though he kept nothing for himself, but distributed daily the Caliph's share. At his death only one piece of gold was found in the treasury, which had been overlooked in a dark corner. The third Caliph, Othman of the Omeyya family, had other views, became enormously rich, built himself a palace at Medina, with marble columns, and walls covered with costly stucco, and gave all the principal employments to his relations. All the nobles of the Koreish, and the governors of cities or countries, built themselves palaces in many places; some of them had revenues of a thousand gold pieces a day. This caused a great scandal to the ascetic Moslems, just as splendid private buildings had scandalised the Romans of the Republic, and, of course, the poor were furious with envy; from this time forward there were constant riots, rebellions, and revolutions; and the old tribal feuds broke out again. After the first three Caliphs, the Caliphate became a vulgar despotism of the ordinary type, only with religious despotism superadded.

Even in the first few years of the second Caliphate, these half-starved barbarians, the Saracens, had obtained the main treasures of the Persian Empire, and the rich plunder of Syria; private troopers had got 500*l.* or 600*l.* a-piece as their share in one expedition, equal to at least ten times that amount now; the imperial carpets of Persia, embroidered with gold and precious stones, were cut up and sold by auction at Medina. The army took to drinking wine, and exchanged their camel's-hair garments for silk robes, while their generals bathed in wine, for which they were all bastinadoed by Omar's orders. Great Arab settlements, Kufa and Mosul, were at once made on the Euphrates and Tigris, and these as well as all the other settlements must have had mosques built. In some places, as at Damascus, the cathedral was shared between the Moslems and Christians. We know of the Mosque of Amru being built at Cairo, and Omar's mosque at Jerusalem, but whether this was the dome of the rock or the Mosque El Aksah, I must leave the learned to decide, the best authorities believe it to have been a little wooden mosque: these monuments, when not of wood, were doubtless constructed with materials plundered from ancient edifices, and were designed by Byzantine, Syrian, Persian, or Koptic architects.

If Byzantine architecture is chaotic as regards dates, what can be said of Saracenic architecture, of whose early work we know nothing, nor of the Indian, or Koptic architecture, from which or from the Byzantine all their new architecture must have been taken, and we know very little of Persian architecture. Even before a conquered world lay at the feet of the Saracens, fierce conflicts were waged between the rival Caliphs and claimants of the Caliphate; religious seditions were rife and tribal feuds, so that between them everything was destroyed; the holy Medina, the scene of much of the prophet's life, inspirations, and preaching, and the site of his tomb, was given up to pillage by Yezid I.; horses were stabled in Mohammed's mosque, and the very Kaaba of Mecca was burnt down; and besides all the plundering, burning, and destruction in the days of the Omiades, in the first days of the Abbassides, 132 A.H., the empire began to break up. Spain never acknowledged their sway, and all North Africa, except Egypt, had to be re-conquered, and still greater destruction took place at the end of the Abbasside dynasty, when the private disputes of Turks and Tartars were added to those about the religion, the predominance of tribes, and rival dynastic

claims. After the Arabian Caliphate was at an end, and the rulers were mainly Turks, the part under their sway was like the East after Alexander the Great's death, the kingdoms were constantly being overrun and re-conquered, and then there was the destruction by the Crusaders. Subsequently a fresh tide of destruction overwhelmed the greater part of Asia when Tamerlane and his savage hordes swept over it.

I think it most probable that while the Conquests were being made, the Saracens, who were little better than banditti, loosely held together by a common faith, and the love of bloodshed and plunder, were not very likely to settle down to study the fine arts, even if pure Arabs ever did, and this is, to some extent, borne out by the fact that Welid I., 86 to 96 A.H. (705 to 715 A.D.), although he built much, and encouraged manufacture and design, accepted 60,000*l.* in gold, camel-loads of mosaic, and one hundred Byzantine masons from Justinian II., Philip Bardanes, or Anastasius II., for the construction of new mosques and the repair of old ones; it is also said that, in a treaty between him and the Byzantine Emperor, the latter was to furnish the mosaic for his new mosque at Damascus.

As late as Abd-al-Rahmân I., the last of the Omiades, who became Caliph of Spain, and reigned from 138 A.H. (754-787 A.D.), architects and skilled workmen are said to have been sent him by the Byzantine Emperors to build the mosque at Cordova, and all the monarchs of Europe sent him columns plundered from ancient edifices for the same purpose. Ab-al-Rahmân I. is said to have founded universities in Spain.

We do not read of much study of philosophy and the arts till the days of Harun-el-Rashid and his son Mamun, 169-183 A.H. (785-813 A.D.).

Haroun was the son of the Calif Mehdy, and Kheizran, the daughter of the Governor of Herat. His famous Vizier, Jafar, the barmecide, so well known to us from the "Arabian Nights," a patron of learning and the arts, was descended from a great family of Balkh. He is said to have been the greatest instance of the vicissitudes of fortune, for in Harun's "Book of Accounts" 400,000 pieces of gold are entered as the price of a dress of honour for him, and a few days afterwards ten karats (5s.) for reeds and naphtha to burn Jafar's body. Mamun was also the son of a Persian Princess, and for some time held his Court at Merve. I merely mention this to account for the encouragement given by them to Turks, Persians, and Indians. Mamun is said to have founded colleges and libraries, and to have commanded Mohammed Ben Musa to publish a book on quadratic equations, called "Al Jebre al Mokabala" (restoration and reduction), from which comes our word Algebra. The substance of the work appears to have been derived from Hindoo sources. Subsequently, the works of the Greek physicians, philosophers, arithmeticians, and geometers were translated, and physic and mathematics became favourite studies of the Saracens. The Abbassides had great influence in Persia, Khorasan, Afghanistan, and Bokara. They were descended from El Abbas, the time-serving uncle of the prophet, and, not like the Omiades, descended from his enemies. They seem, however, to have been less noble and less liberal, and even more bloodthirsty and perfidious than the Omiades, yet their reigns are held to be the golden age of the Caliphate: they introduced Turks for their fighting men, and Greeks and Persians for posts where intellect was wanted, commonly called officers of the sword and of the pen. After their extinction, Turks mostly filled their places; the Arab race having lost its religious enthusiasm, fell gradually into a lower grade.

In some respects the Moslem world,—as far as architecture was concerned,—was in much the same position as Europe is now; it had become enormously wealthy, new buildings were made on an unprecedented scale, and the main architecture of the world lay before it for study, but there was no Saracenic style; the buildings were in the style of the country or town in which they were erected, or in the style used by architects who designed them. I say this, however, with some diffidence, for the mosque at Cordova, San Cristo dela Luz, at Toledo, and Sta. Maria de la Blanca, are unlike anything else I know. The attractions of living styles are greater than we could imagine, if we had no such frequent examples before our eyes.

English architects of all degrees of excellence and talent go to our dependency, India, and whether they affect Classic, Gothic, or Renaissance architecture here, they at once take up with the native style of that part of the country they inhabit, or paraphrase the Moslem buildings they find there; and it is the same in Egypt. The last hotel built by an English architect, close to the Pyramids, has its architecture borrowed from the mosques, even to the niche. It is admitted that the Saracens brought no style with them from Arabia, but adopted features that pleased them from the countries they conquered, the most characteristic feature being the minaret, and this is said to have been Persian; the dome was taken from the Byzantines or Persians, the niche (mehrab) from the apse of Christian churches, floral ornament that was not Byzantine probably from Afghanistan or India. Fergusson remarks on the similarity of the ornaments on the tomb of Mahmúd of Ghuzni to those used in the mosque of Ahmed-Ibn-Tulun at Cairo, only this would suppose that it was not indigenous, unless indeed it was not done till Lagin's time, for Ahmed-Ibn-Tulun died in 883 A.D., and Mahmúid of Ghuzni was not born till 967 A.D. Architects in the Arabian Nights are mostly called mathematicians or geometers, and when they were thoroughly imbued with geometry, they made great advances on the geometrical patterns of the Byzantines, on which it was based, so as to completely transform them. One of the most striking peculiarities of Saracen art is the stalactites. There is an ingenious and plausible theory that may turn out to be the true one, that the stalactites or honeycomb work sprang from the brick niches in the domes or steeples of the tombs of Ezekiel and of Zobeida, Er-Rashid's head wife, both near Baghdad. These spires strongly remind us of jelly-moulds. If it came from these niches the Moslems developed them to a degree that bears no resemblance to the originals, for who would trace from this the stalactite domes of the Alhambra? These are certainly some of the most wonderful achievements of man, in fact, they suggest the work of enchanters, or of being sent down from another world. At first sight their maddening complexity and their apparent want of support makes it impossible for us to conceive that mere human beings could ever have invented or produced them; one would be led to believe that the Spanish ones were suggested to some genius by his seeing some pieces of wood of unequal length, whose ends had been shaped, put together for mosaic, like Tunbridge ware, for every wood corbel or capital I examined in Spain was made up of separate squares, oblongs, and triangles. The Saracens also invented a system of ornament, in which one pattern was laid over another in low relief, and perfected by colour and gilding; this is magical in effect, for each change of position brings out a new pattern and a new predominating colour. To them, too, we owe the perfection of mnemonic ornament, formed by overlaying a floral ground with Kufic or other writing, which is as distinctly Moslem as their maddening geometrical ornament on stalactite work. The ancient Egyptians, Persians, Greeks, Romans, and Byzantines produced works infinitely grander and more dignified; and the Greeks works infinitely more beautiful, and of a higher style of beauty, but no people have ever produced anything so magical or so sumptuous in colour. The human figure and the representation of any living thing was forbidden by their religion, though Mesopotamians and Persians did even try their hand at this form of art. By the Moslems every handicraft was carried to a perfection before unknown in the world; from the temper of a sword-blade to the weaving of a robe or a carpet; even now their enamelled glass and pottery, their damascened work, their wooden lattices, cabinet-work, carpets, and illuminations, are, in some respects, unsurpassed, and fine specimens fetch their weight in gold. And so superior were their works to those of European manufacture, that when the Christians began to imitate their costly stuffs, chased brass, or damascened work, it was a common practice to put Arabic letters on them, to ensure a market, in the form of texts from the Korân, but meaning nothing. As late as the Porta della Carta of the Ducal Palace at Venice, Arabic letters in imitation of an inscription were put on the dress of one of the figures, the solution of which was long an enigma to scholars.

It is quite possible that the real Saracens had no capacity of invention nor for the fine arts. At any rate, scarcely any buildings of great artistic merit have survived them, for, with the exception of the Mosque at Cordova, real Saracenic buildings are of the eleventh and twelfth centuries. But, supposing they had neither taste nor invention, they would none the less claim our admiration and gratitude. They expunged the worn-out civilisations of the world, and imparted to the survivors their own resistless energy, their simple faith, and a lavish generosity, so that their successors, perhaps blessed with higher capacities, overspread the world with elegant and sumptuous monuments from Spain to the Indus, and from the Red Sea to the Atlantic. Every country beneath their sway flourished like a garden. Stock was increased, and the breed of horses greatly improved. Every town was a hive of industry, from which issued the most splendid arms and armour, glass, metal, and woodwork, enamelled earthenware, velvet, satin, silk, and cloth of gold, of splendid patterns and gorgeous colours; from them lawns, crapes, and delicate muslins were spread over the earth; arts and literature, science and speculative philosophy found their homes amongst them and spread light among the surrounding darkness; the inventions of the East were communicated to the West, not the least of which were the Arab arithmetic, algebra, and the mariner's compass, until they may be said to have been smothered by the wealth and plenty their industry had created. The splendid mosques, tombs, towers of victory, hospitals, khans, and palaces with which the Moslem conquerors enriched India alone, probably exceed in number and magnificence all the monuments of Europe since the Renaissance; not to speak of their bridges, aqueducts, and tanks, new phases of architecture, and new systems of illumination and ornament were invented, and in the later Crusades the manners and morals of the Moslems were held up as patterns to the Christians by their priests.

It seems a pity that most of their monuments are perishing by decay, or by more wanton destruction, and when they are gone we shall have but indifferent records of their glory.

We are now in Egypt and in India: in both these countries we have done much for the natives, and nothing for ourselves. It is humiliating to remember that the great Napoleon, though he only held Egypt for a short time, began that work on Egypt that the succeeding French Governments continued and completed in thirty-seven volumes of "Atlas" folio. There is very much admirable Saracenic work to be deciphered and delineated, and we also hold Scind and the Punjab, that were the extreme confines of Saracen sway, not to speak of the Mohammedan art of India that was created under the Mogul rulers.

From our friendship with the monarchs of Afghanistan and Persia, their monuments might be drawn and published, which would probably give us the clue to the development of Saracenic art. Unhappily our Government is not only quite unmindful of such duties, but does its best to prevent private enterprise. In France an expensive work of the sort would be patronised by the Government, and even if it did not contribute directly to it, many copies of the work would be purchased and distributed in libraries and art schools; but here, on the contrary, the unfortunate author would be plundered by the Government; and yet we wonder that so few magnificent architectural works are published in England.

ROYAL INSTITUTE OF BRITISH ARCHITECTS:

THE PRESIDENT'S ADDRESS TO STUDENTS.

THE sixth ordinary meeting of this Institute for the present session was held on Monday evening last, at 9, Conduit-street, Mr. J. Macvicar Anderson, President, in the chair.

Mr. W. H. White, Secretary, said he announced with regret the decease of Mr. Alfred Porter (Fellow) and Mr. H. C. Elworthy (Associate).

Mr. Aston Webb, Hon. Secretary, read a copy of a letter from the Council of the Institute to the Architectural Association, notifying to the latter body the determination of the Institute to grant 300*l.* in support of the Association's educational scheme, such sum to be paid in three annual instalments. A letter from the Secretary of the Architectural Association, conveying a special vote of thanks to the Royal Institute for its promised donation, was also read by Mr. Webb.

The President then delivered the following address to students:—

If it be true that one of the chief difficulties that attend the study of architecture is to be found in the number and variety of subjects with which it is essential to be more or less familiar, it is no less true that the comprehensive nature of the pursuit constitutes one of its greatest attractions, for it opens up a field of inquiry over which the mind may roam with ever-increasing vigour and interest. Absorption in one particular subject of study may produce lassitude, but no amount of devotion to a study so varied as that of architecture should ever conduce to such a result, for mental refreshment is to be found—not in cessation—but in variety of thought, and the student of architecture need never experience difficulty in finding mental repose by turning from one to another of the many fields of research that lie before him. For example, in History he will find the phases depicted through which the art has passed in by-gone ages; in Literature he will become familiar with the opinions of great masters which imparted individuality to the art of different epochs; in Nature he will gather, from the development of the mineral and vegetable creations, the properties of the materials in which his designs will have to find expression; in Science he will learn what is the strength and formation of such materials, and how to adapt them to his requirements without doing violence to their material characteristics; in observation of the executed works of others, whether ancient or modern, he will, from sketching and measurement, discern how successful results have been attained, or artistic effects produced; while in Design he will apply the varied knowledge he has thus acquired from History, Literature, Nature, Science, and observation, and, by the artistic and scientific treatment of the materials at his command, he will impress his ideas and personality on the architecture of his day.

For the successful pursuit of a study so varied and so fascinating many qualifications are desirable, but three are essential: Natural aptitude, Application, Imagination. Without the first, the student will do well to abandon the career, even though he may have spent time in discovering his want of affinity with it. Many illustrations from real life might be quoted of men who had devoted years to the preliminary study of a profession only to find that they had no aptitude for it, and have with good sense left it for a more congenial career, in which they have earned reputation and renown. If the heart, as well as the intellect, is not engaged in the work of life, you may possibly, in favouring circumstances, attain to respectable mediocrity, but you will never achieve real success. Be sure, therefore, at the outset, that you possess that earnestness of purpose and heart-love for your work which spring from natural affinity and cannot exist without it. It is needless to insist on the importance of Application. Original genius or natural endowments cannot be acquired or imparted, but it is marvellous to what an extent application compensates for the lack of such gifts. Was it genius that led George Stephenson to perfect the invention of the locomotive steam-engine,—probably the greatest promoter of civilisation that the world has ever seen,—or was it simple indefatigable application? Read his life, if you have not done so, full of lessons for all, and judge for yourselves. Or, again, look at a life but recently terminated; admittedly unendowed with genius, but possessed of good sense, honesty of purpose, and earnest application, how startling the success, how remarkable the position, which was achieved by the late First Lord of the Treasury! If you have application, you possess one of the most powerful levers with which to remove and triumph over difficulties. But it is obvious that natural aptitude and application, invaluable as they are, are not sufficient to qualify you for the career on which you are entering. Far away the most important work of your lives as architects will be that of design, and if you are devoid of the mental endowment of imagination,—by means of which alone can there be design,—you will be like a ship without compass or rudder, your lives will be aimless, and you will miss the prize of your calling. Possessed of all knowledge, your works, without imagination, will be but imitations and reproductions, not designs. Equipped with learning, but devoid of creative power, you would not be artists, and, therefore, could not be architects.

I have glanced at the varied nature of your engagements as students of architecture; it would be manifesty impossible within the brief compass of this Address to discourse on all, or even a few, of these with any prospect of a beneficial result. I propose, therefore, to confine my remarks to one branch of them only, and to ask your attention to a few suggestions respecting it. The subject which I have selected is what I do not hesitate to refer to as "The Art of Planning." No doubt there are those who will regard such a designation as a contradiction in terms, for it is to be feared that there are not a few who consider planning as, at the best, a very prosaic part of an architect's work, and to whose poetic fancies the idea of elevating it to the dignity of an art may appear to be a sort of architectural blasphemy. There are others who, without going so far as this, do not hesitate to relegate planning to an inferior and subordinate place, not worthy of the exercise of the higher and artistic faculties of the designer,—a constructive skeleton, as it were, admirable it may be in its mechanism, but which the architect must clothe with grace before it can be admitted to the sacred courts of art. Now I do not hesitate to declare that such views of planning are thoroughly fallacious and injurious to the best interests of architecture, because derogating to a commonplace utilitarianism what is really an integral and inseparable part of the art, the root from which grow the loftiest conceptions, the suggestive source from which springs all that follows.

Thus viewed, you will see at once that it is impossible to exaggerate or over-estimate the importance of the study of planning. It may indeed be safely asserted that there is no study in which the human mind can engage, on the results of which the comfort, convenience, and happiness of society so much depend. This, I admit, is claiming a good deal, but no more than the study properly demands. It is not my purpose at present to emphasise utilitarianism, but do not forget that every building is designed for use; to say so is not to derogate from art, because the highest art is displayed when a building is so designed as most successfully to fulfil its purpose by combining fitness with beauty. Thus the primary field for the exhibition of the architect's art is planning. This does not appear to admit of doubt. Let me demonstrate it. What is architecture? Is it the mere clothing of the structure? or is it the artistic design of the structure itself? Unquestionably the latter, and if so, how can the study of planning be other than artistic work, the primary stirring of the dry bones out of chaos, and the life inspiration which creates out of them the useful and the beautiful? for planning is not the mere casual throwing together of so many forms; the chance disposition of so many lines representing walls, enclosing so many haphazard spaces representing rooms; it involves the exercise of imagination. The design of the plan is the medium for educing this quality, just as much as the design of the elevation; it is customary, no doubt, to hear the word design applied to the latter much more than to the former, but the one is really just as much design as the other; consequently the plan affords the opportunity for the display of artistic power just as much as the elevation. Not only so, but a true artist, while studying and elaborating his plan, has a mental drawing-board by his side, on which he rears in his mind's eye forms and proportions suggested by it and emanating from it; he disposes the arrangement so as not only to meet the requirements but also so as to produce a happy result in point of effect; in short, the two things go together, they are mentally indivisible, and must be elaborated, not without reference to one another, but in unity. Hence experience demonstrates that a good plan will generally be found to produce a good elevation; they are integral parts of a whole; the one having been artistically studied with a view to the other, the result will be harmonious; if the tree is good, so will the fruit be.

Did time permit, it might be interesting to divide the subject, and classify it under separate heads, treating each in turn, as for example:—The plan ecclesiastical, the plan collegiate, the plan palatial, the plan municipal, the plan judicial, the plan official, and the plan domestic; and a moment's reflection will show you how easily we could find in the elaboration of the characteristics and requirements of each, much that might profitably engage our attention. I must, however, content myself with a more general treatment, touching briefly what may be called principles, leaving the application of them to your own imagination.

None but those who have made a real study of planning, have any conception of the infinite breadth and variety of the field of design which it creates; they only know experimentally the charm of puzzling over difficulties; of revising, re-arranging, and re-disposing, in order to overcome them; thereby probably creating other difficulties, which in their turn have to be surmounted by a further similar process, and so on, until, after many disappointments, many failures, and many inventions, a satisfactory result is at length reached. It is now many years since I resolved never to let a plan leave my hands until I felt satisfied that it was right; and in battling with the difficulties thereby created until they have been successfully obviated, I have found some of the most engaging studies of professional life. The question with you should never be, whether a plan is good enough,—that is an unworthy standard,—but rather, is it the best that I can design? the former, the "it-will-do-well-enough" standard prevails far too commonly, the latter is the only standard really worth working for, because the only one which will lead to attainments beyond mediocrity. Never, then, rest content with a plan until you are satisfied that it meets and fulfils all the requirements of the case, in the best and most complete manner that you can think of; the plan is the foundation of the whole design, and I need not say to architectural students that if the foundation is faulty, there is not much hope for the superstructure.

It may seem like insisting on an elementary truism to say that the plan of a building must necessarily be adapted to, and governed by, the exigencies of the site, but the not infrequent violation, or rather neglect, of so obvious a principle, justifies me in emphasising its importance. The peculiarities of a site in respect to levels and aspect frequently constitute difficulties that at first sight appear insurmountable, but out of which emanate in skilful hands the happiest results, which otherwise might not have been thought of, or attained. Herein is displayed the skill of the artist, to lay hold on all such adventitious circumstances and hindrances, and conform them to his will, translating obstacles into mediums for achieving success. The neglect of such opportunities is unpardonable, and betrays the bungler.

Prospect, again, constitutes an important factor in planning. When the right aspect presents the best views, the case is simple, but this is often not the case, and few conditions call for more ingenuity that when the proper aspect is at variance with the prospect that it is desirable to secure. In towns, indeed, aspect and prospect must necessarily, and to a great extent, be subordinated to immovable conditions, but in the country it is different. While, therefore, striving for comfort, convenience, and grace within, never neglect an opportunity of securing the inestimable attraction of a higher than any art loveliness, the prospect of nature and creation. In connexion with prospect let me in passing condemn a practice too much in vogue, the glazing of the upper portions of windows with tinted stained or painted glass, sometimes uglier than anything it is intended to obscure from view. Situated as we are in London, the expedient is, no doubt, attended with advantages, shutting out hideous objects which one's neighbours are so fond of obtruding, or excluding the impertinent gaze of the too curious; but in the country, where it is frequently adopted, what possible justification can be urged? Is it possible that anything can compensate for the light of the sun, the beauties of nature, or the marvels of the heavens? Never, then, attempt to obscure the contemplation of God's universe by the commonplaces of humanity.

I would say, further, that a plan to be good must be simple. No doubt the arrangement of some buildings is necessarily more elaborate than that of others; but you may take it as an unerring guide, that when you find a plan becoming complicated and confused, you are on the wrong tack. I have seen an artist, after hours of work, wipe from his canvas all he had painted, and then make a fresh start with manifest advantage and no real loss of time; so when your planning results in complication, your best course is ruthlessly to obliterate what you have done, and begin *de novo*. Nothing will compensate for the absence of simplicity in a plan. This is a golden test which I have never hesitated to apply, and I speak from no inconsiderable experience.

[*Continued on page* 80.

Illustrations.

OLD HOUSE, IPSWICH.

THIS house, which is known in the town as "the Ancient House," is one of those buildings which has passed through many hands, and has received great care from its various owners, who were all presumably wealthy men. Erected in Tudor times, it was added to and beautified in Elizabeth's reign, still further decorated in the Jacobean era, and shortly after the accession of Charles II. the magnificent pargetted front was added, and, finally, in Queen Anne's reign the front rooms on the ground floor were all redecorated in the prevailing style of the time.

The principal front is towards the Butter Market, but it has also a return elevation to St. Stephen's-lane. The first floor consists of four large oriel windows to the Butter Market, and one on the return elevation to St. Stephen's-lane. These oriels sustain a wide projecting cornice, and between them are massive pilasters, all in plasterwork. Above the oriels, set back to wall line, are four dormer windows breaking out of the main roof.

Many years ago in one of the attics there was a portion of the roof space that had not been carefully investigated for a long space of time. It chanced, in 1801, that this was broken into, and the result was that a beautiful little single hammer-beam roof was revealed with carved arches and angels on the ends of the hammer-beams. On examination this proved to be the roof of a chapel or hall ceiled and floored over at the plate level, the main body being absorbed in the room below. The space covered by this roof was 23 ft. long by 15 ft. 7 in. wide, and the principals were three in number. This ancient relic gives us a clue to the probable age of the original structure, which was probably the residence of a wealthy man in the fifteenth century. The next addition seems to have been made in 1567, as in that year a certain George Copping and Elizabeth, his wife, caused a room on the ground-floor to be panelled out and inserted the date and their monograms in the mantel-piece. An open corridor with rooms over it, forming the wing before alluded to, in St. Stephen's-lane, was also added about this time.

In 1603 a room on the ground floor, away from the street, was panelled in oak whole height of the room, the beams were encased in panelling, and a gorgeous mantel-piece was put up, covering the end of the room entirely with the exception of two small doorways. This is, presumably, the work of a man called John Sparrowe, who owned the house at this time, and from whose family it derives the name of "Sparrowe's House." The initials J. W. S. and the Sparrowe arms, together with the date 1603, all appear on the mantel, and a representation of the arms is also repeated in the glass in the window, though this is evidently not in its original setting.

The treatment of the design is as follows:—On a brick base, some 4 ft. high, is placed an oak sill, into which are framed elaborately carved pilasters, 7 ft. 4 in. high, with Ionic caps, from which spring highly ornamental carved brackets carrying the overhang, the corner-post being similar in design to the pilasters, but on a larger scale, and placed anglewise. The overhang, which is very great, is still further emphasised by the projection of four oriel windows to the Butter Market and one to St. Stephen's-lane. Above the oriels runs a bold Classic cornice in wood, and over each oriel to the front is a dormer window lighting the attics, also enriched with pargetting. On the front faces of the oriels to Butter Market the four quarters of the globe are represented in high relief in parget, and the return oriel to the lane has Atlas supporting the world on its similar face. The curved sides of the oriels are decorated in scroll work and other devices. Under the upper cornice are swags composed severally of flowers, fruit, birds, fishes, and musical instruments. Between the two centre oriels is a panel containing the Royal Arms, with supporters and crest, and the letters C. II. R. (Charles II, Rex.). In the gablets above are various Classic scenes and characters, and on the end gable St. George slaying the dragon, and Phillida and Corydon below. The modelling is coarse, but the general effect is bold and striking. In the centre of the house is a courtyard, with some rich parget work depicting a triumphal procession on a gable face. Inside are several panelled rooms and some highly ornate ceilings. The building is minutely described in Glyde's "Old Ipswich." JOHN S. CORDER.

ST. CUTHBERT'S COLLEGE, WORKSOP.

THE drawings show the southern front of the quadrangle and the southern side of the dining-hall of the buildings now in course of erection for a lower middle-class school in connection with Lancing and Denstone Colleges, corresponding with the schools at Ardingly and Ellesmere.

The college is founded by the Provost and Fellows of Denstone College as a public school for 500 boys, to be boarded and educated at a cost of less than twenty guineas a-year, and the buildings are being erected under the College Architects, Mr. R. Herbert Carpenter and Mr. B. Ingelow, of London. The site, of ninety-three acres, given by the Duke of Newcastle, commands the Clumber Woods on the south, and the Priory Church and town of Worksop to the north-west, with the Yorkshire hills beyond. In addition to his gift, the Duke has formed and planted the roads and grounds.

Excepting the chapel and dining-hall with its offices, the buildings are arranged round a quadrangle, 170 ft. square, of which the school-room and class-rooms occupy the north side; and dormitories, day-rooms, masters' rooms, &c., for 200 boys on each of the side wings, with dormitories, associates' rooms, &c., in the southern front building, the head-master's house being at the south-west angle. The chapel is to the north-east, and the dining-hall (and offices, laundry, &c.) to the north-west of the great quadrangle. The chapel, exclusive of the ante-chapel, will be 140 ft. long by 40 ft. wide; the hall, 120 ft. by 36 ft.; the school-room, 100 ft. by 36 ft.

The buildings are faced with Nottingham bricks, which are also used for mouldings. The dressings are of Kiveton Park (Anstone) stone. The principal rooms and the cloister, which is on the inner side of the quadrangle, are faced with similar bricks, while Lincoln bricks are used for the inner walls.

The contract for a great part of the superstructure is taken (in divisions) by Mr. Vickers, of Nottingham, the foundations having been put in by Mr. Bentley, of Waltham Abbey. The architects' clerk of the works is Mr. F. E. Smith.

The elevations are from drawings exhibited at the Royal Academy of 1891.

MISSION CHURCH AND HALL, CANTERBURY-ROAD, S.E.

THIS building, the drawing of which was in last year's Academy, has been erected for the Mission at Camberwell in connexion with Corpus Christi College, Cambridge. It is a building of two floors, having on the ground floor a large hall with glazed brick dado, 5 ft. high all round, and a platform at one end, kitchen, heating-chamber, &c., and a distinct entrance to the hall from the street. On the first floor, approached by two wide stone staircases, with separate entrances to the church, capable of seating about 400 people, with chancel, organ-chamber, and vestries. The exterior is faced with red brick, and has stone dressings with traceried windows to the chancel of the church. All floors are fireproof, and the heating has been carried out on Grundy's Hot-air System. The cost of the buildings was nearly 5,000*l*. The architect is Mr. Richard J. Lovell, of London, who was also the architect of Holy Trinity Church and buildings, Old Nichol-street, Shoreditch, completed some little time ago, and originally built in connexion with Magdalene College, Oxford Mission, but now used and consecrated for a parish church.

NEW MINERAL-WATER WORKS AT COLWALL, NEAR MALVERN, FOR J. SCHWEPPE & CO., LIMITED.

THIS building, which is now nearing completion, is being erected for the Directors of J. Schweppe & Co., Limited, for the manufacture of their mineral waters.

It is placed at the foot of the Malvern hills, close to the Great Western line, and adjoins Colwall station, in the midst of some of the most beautiful scenery of the west of England, and considerable trouble has been taken to make the building harmonise with its beautiful setting, the usually more or less hideous "factory" features having been so toned down and metamorphosed as to be quite unobjectionable.

The building, which forms the nucleus merely of a much larger establishment proposed in the future, consists of a manufactory, with packing, unpacking rooms, store-rooms, carpenters' shop, engine-room, boiler-house, &c., and is of red local bricks, with Bath stone dressings, roofed with Brosely tiles; the internal paving is being carried out by Stuart's Granolithic Company; the ornamental ironwork by Messrs. Braun, of Birmingham; the cranes and hoists by Mr. Stannah; and the boilers, engine, &c., by the Riley Manufacturing Company, of Lambeth. The contractors for the whole are Messrs. Josh. Wood & Son, of Worcester. The architects are Messrs. Truefitt & Truefitt, of London.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

(*Continued from page 79.*)

Again, a plan is only good when it is the embodiment of thrift. Much has been said, and more has been written, on the moral aspect of thrift, and it would be easy to enlarge on the advantages of its application, not merely to the life, but also to the artistic work of the student of architecture. I must, however, be content for the present to deal with it in its relation to my subject, and to show that without thrift, both of space and material, a plan cannot properly fulfil its purpose. Thrift is not parsimony, any more than liberality is waste. Each space in a plan, be it room, hall, stair, or passage, should be just the size that is necessary for its purpose; if it be less, there is parsimony, for what is inadequate will have to be enlarged hereafter at much more than what would have been the original cost; if it be more, there is waste, for it has involved the expenditure of more capital than was required, and will incur needless labour and consequent cost in maintenance. Take, as an illustration, a room which has been designed on a scale beyond the necessities of its occupants; it is obvious that it has cost more to build and furnish than it should have done, and involves a perpetual cost for maintenance and service, which should have been avoided; hence the happy medium is to be found in thrift. So in respect to materials; walls should be of sufficient thickness, floors and roofs of sufficient strength for their respective functions, not much more, and not much less; else there will ensue, either waste in the first instance, or parsimony, which will involve waste in the long-run. There are, however, cases in which materials should not be too sparingly employed; in a mansion, for example, intended to be a family home, and to pass from generation to generation, it would be unwise, and out of keeping with its purpose, to apply too literally such a condition as this; for nothing imparts more dignity and a greater idea of the enduring purpose for which such an edifice is designed than massive walls, thicker no doubt than may be actually required for sound construction, but not more than is called for in order to be in harmony with the traditions and associations that the structure will represent. This, however, is but one of those exceptions that prove the rule of thrift which I have enforced. I am, of course, not unprepared for the inevitable protest of the art-student, who in a burst of æsthetic enthusiasm will denounce the suggestion that so prosaic a quality as thrift should dare to enter the hallowed sanctuary of the art studio; but while entertaining much sympathy with the enthusiasm of youth, and by no means desiring to curb it, and while respecting opinions which I doubt not are perfectly genuine, I venture to think that it would be easy to demonstrate that it would be in the true interest of art, were her portals more frequently and more hospitably thrown open for the admission and entertainment of the prosaic maiden I have introduced to your notice. How often, for instance, might she, with manifest advantage, restrain the artist hand in scattering with inartistic profusion ornament which is misplaced and therefore ineffective? But to enter on such matters would be to deal with other branches of the architect's studies, and be foreign to my present purpose.

I need not detain you by enumerating conditions, more or less obvious, each one of which contributes in its place to the merit of a plan. Apart from considerations of aspect, prospect, and dimensions, each place should be—not only

convenient in itself—but should be in its proper position in relation to other places; the work of an establishment, as well as the cost, may be materially diminished or increased, according as this condition is observed or neglected; doors, windows, fireplaces, should be arranged so as at once to promote comfort and convenience without needlessly destroying wall-space, or incurring draughts; the amount of window-space should be regulated according to the aspect; and many other considerations of a similar nature should be duly thought of; in short, the perfect plan is, and can only be, the result of the thoughtful study of each principle and every detail: none are too minute to be overlooked: as little things sweeten life, so attention to little details makes a plan complete.

I have written to little purpose if I have not convinced you that planning is one of the most important, difficult, and artistic studies of the architect.

Now let me inquire why it is that plans are so frequently bad. I am aware that there are men in the profession who are adepts in planning, and whose productions in this respect we admire. But are they the majority? Rather, I fear, will they be found to be the small minority. Rarely do I examine published plans without detecting faults which are obviously not the necessary outcome of the circumstances. Why is this? In the majority of cases it does not, I belive, arise from lack of ability on the part of the author, but from the neglect to apply the ability he possesses to the working out of a good plan. Where plans are bad, they are so from two causes. 1. It is impossible to produce a satisfactory result without practical knowledge of the requirements; in the case of a gentleman's house, for example, how can we expect to succeed without being familiar with the nature and working of the establishment? 2. Plans are bad because they are not studied as they should be; I am satisfied that there are many practising architects who have never realised the true nobility of planning, who have never experienced the fascination of the almost exhaustless field it presents for the display of imaginative artistic skill, and who consequently have concentrated their artistic powers in the design of the elevation. Need I guard myself from possible misconception by adding that not one word I have written is intended to militate against the importance of artistic design as applied to the elevation? My subject is Planning, and my remarks naturally apply specially to it. Moreover, architects are not likely to regard the design of the elevation as the least artistic portion of their work, and it is because I entertain the conviction, judging from results, that they do far too much regard the design of the plan in that light, that I have emphasised its artistic character.

The architecture of the future will derive its character, and find its development, from the students of to-day; hence I have been tempted to embrace this opportunity to bring specially before you the subject of planning, believing that those who undervalue it do so because they have not studied it and tasted its fascination, and in the conviction that there is no more useful as well as artistic study in which you can engage. Remember that the subject vitally affects you who are devoting your lives to the study of architecture, and that your treatment of it will still more vitally affect those for whom, by and by, you will be called on to design; nothing will so certainly secure for you their grateful blessing as to promote the comfort, convenience, and beauty of their homes, for on nothing does the daily happiness of civilised society so greatly depend. If I have succeeded in elevating the study and lifting it out of the prosaic level from which it is too generally regarded; if I have inspired in any of you, whom it is my privilege to address, the determination to throw yourselves into it with an enthusiasm which you may not hitherto have displayed; if I have thus, through influencing you, sowed seed which will fructify for the benefit of succeeding generations; if I have demonstrated that in this study is to be found one of the most interesting, fascinating, and artistic pursuits, the time will not have been misspent which we have this evening devoted to the consideration of the Art of Planning.

On the conclusion of his address, the President stated that he had originally intended to embody in it some critical observations of the prize drawings; but in consequence of illness he had been unable to do so. Mr. Aston Webb, however, had been kind enough to prepare some critical remarks with regard to the drawings, which he would now call upon him to read.

A REVIEW OF THE STUDENTS' WORK.

Mr. Aston Webb, before reading his criticism of the various drawings which had been submitted, said that he was sure they must all feel delighted to have their President back in his accustomed place that evening. He was sorry that, under the circumstances, it had fallen to him (the speaker) to read the notes instead of the President. He continued as follows:—It has been usual year by year for the Institute to publish in its *Proceedings* a more or less critical notice of the designs submitted for the various medals and prizes annually offered in competition by this Institute, and it has been thought that it might interest our students if I were to put down, as your Honorary Secretary, a few notes on the designs and drawings submitted this year. In doing so, I shall address myself to the students, and especially to those who are intending to compete in future years, and if what I say has been often said before, this is my excuse for it. The prizes which are offered by the Institute are for,—1. Original architectural designs. 2. Designs in which construction is the principal problem. 3. Drawings of old work on given subjects and written essays.

Pugin Studentship and Institute Silver Medal.—I will take the drawings of old work first, for which are offered the Pugin Studentship and Institute Silver Medal, and before noticing the drawings sent I should like to say a word on the sketching of old work generally. This sketching may be of the greatest use to you hereafter, or it may be absolutely useless; you must sketch with your head as well as your hand, as Mr. Waterhouse said in one of his addresses; do not lay by too many pretty sketches to be shown to admiring relations and friends, for if they are of such general interest you may be pretty sure they are of no practical value. I believe you learn far more by measuring thoroughly a well-designed, moderate-sized church, a single bay of a cathedral, or a complete portion of any other good building plan, elevation, section, and details, and by trying to understand what were the difficulties of the designer and how they were met, than by any number of sketches of pretty bits. Not that I mean for a moment to underrate the importance of detail,—it is, of course, the essence of design; but many of the sketches one sees are valueless without some figured data of the position in which they occur. When you sketch an arcade, make a plan, however rough, with figured dimensions of the width of nave and aisle, and heights of both; if you sketch carving, note the height from ground and the scale of the work around; above all things, learn to appreciate scale and dimensions,—a difficult thing to do, no doubt. In sketching a roof, make a note of the main scantlings and a window, the size of mullions, widths of lights, thickness of wall, height from ground of the sill, and so on; this seems a mere truism, yet it is often absent, even in the drawings here. It is not necessary that all your drawings should be geometrical ones, but do not be afraid of disfiguring your sketches with a few main dimensions: it will add to their value. The late Mr. Street's sketches were models in this respect, as in so many others. Try and realise the scale and dimensions of things, how they were designed for their respective positions; and so, when the time comes to turn your own ideas into stone, you may be able to realise your own ideas, and know beforehand what will be the result of the work you will produce so sanguinely at your drawing-board. If you do not do this, disappointment and discouragement only await you. Remember most can appreciate the effect of work when executed; it is for an architect to appreciate its effect in an earlier stage when it is on paper only. But to turn to the drawings.

For the "Pugin" this year five sets of drawings have been submitted, the Studentship being awarded to Detmar J. Blow, his principal contribution being plans, sections to ½-in. scale, and full-size details of the choir aisle of Beauvais Cathedral, a case in point of what I have just said, for I am sure Mr. Blow would tell you how much benefit he has gained by this sound and solid work. Perhaps more time than necessary has been spent in shading and tinting these geometrical drawings, though one is unwilling even to suggest an objection to the means employed in obtaining so excellent a result.

The portions of Barfreston Church are also most thorough and careful; while the coloured sketches show much appreciation of tone and colour, and make us look forward with interest to the result of Mr. Blow's tour next summer.

Another beautiful set of drawings for the same prize are those by Charles A. Nicholson. He sends a particularly able set of interiors, drawn firmly in pencil and well selected; particularly one may mention the Lady-chapel of Long Melford, a perfect little building, and the church at Tilney All Saints; but how much a rough figured section would add to the value of these. The stalls of the choir of Lincoln is another interesting sketch, and the two roofs of St. Stephen's, Norwich, and Wymondham Church, are as well sketched as could be. From these sketches there can be no doubt we shall hear of Mr. Nicholson again.

In quite a different manner are the drawings submitted by Mr. C. R. McIntosh; particularly admirable being his pencil-drawings of Italian Renaissance work,—holy water stoups, torch-holders, &c. The coloured sketches of the Certosa of Pavia are also very delicate and full of feeling, though their effect, I venture to think, is rather interfered with by the exaggerated blue of the shadows. I am also a little doubtful whether the manner of mounting has been the best for drawings of such delicacy.

E. S. Cummings sends another good set. The drawings are wonderfully neat and clean specimens of pencil-work, though I would suggest to Mr. Cummings not to carry the dot-and-spot manner too far; it is very effective as shown in his drawings, and it is pleasant enough to play with, I know, but it is dangerous, and I am afraid leads nowhere. Mr. Cummings, I think, has carried it as far as it ought to go, if not a little farther. The shaded details of carving in the Lady-chapel at Ely are charming, and in quite another manner, though perhaps a trifle overworked.

Percy D. Smith sends some interesting bits, but largely taken from work somewhat later in character than is intended for the study by competitors for the "Pugin," which they should do well to remember was founded for the study of that Gothic architecture which was so much admired and understood by the man in whose memory this studentship was founded.

After the "Pugin" drawings we come to those submitted as the result of his Pugin tour by S. K. Greenslade, the Pugin Student of last year. These are all good, and should be very satisfactory to those who took part in founding this studentship, many of whom are still amongst us. Here is a carefully-measured bay of the Presbytery of Lincoln, plan, section, internal and external elevation. Mr. Greenslade not only knows how to draw, but knows how to select the subjects to be drawn. There is a capital sketch of St. Peter Mancroft, east front, which I missed when I was there. There is a view across the nave at Lincoln showing the Lady Chapel, in which, however, one misses a plan, and many others equally good. Mr. Greenslade appears a giant for work, and has attacked no less than four cathedrals,—Ely, Lincoln, Norwich, and Exeter,—in this single tour, to say nothing of smaller churches such as St. Peter Mancroft and others; dimensions are abundantly sprinkled over these drawings, and add greatly to the value of them.

The other competition for drawings of old work is the Institute Silver Medal, which has been obtained by R. S. Balfour for a very complete set of drawings of Heriot's Hospital, Edinburgh, shown by plans, elevations, sections, perspective internal details, and mouldings to a large scale.

Percy D. Smith obtains a Medal of Merit for a careful, if rather hard, set of drawings of the magnificent Salisbury Chantry at Christchurch, erected at that interesting period when the Gothic architect was yielding to the blandishments of the Italian Renaissance. A chapel of St. Mary, Chichester, appears a most interesting building, though, again, one misses a plan; a sketch of the slightest character would have been welcome.

"Pollux" sends a thoroughly careful and complete set of drawings of Castor Church, Peterborough.

The next set of prizes are those offered for original design, and while in the previous sets of drawings we find the power of draughtsmanship fully developed, the power of design is of slower growth and not developed to the same extent. Remember in these competitions it

becomes a matter of far more importance what you show than how you show it, and though draughtsmanship may greatly help a design, it cannot convert a bad into a good one. A carefully thought-out design will stand a better chance of success than one less considered, however elaborately worked up, and it may be useful to remind intending competitors of the clause in the conditions, "the geometrical drawings must be in outline, with the openings and sectional parts alone tinted in monochrome or hatched." This is intended to exclude shading or etching, but not of course stone-jointing.

The Essay Medal.—Five essays were received, the prize being awarded to "Veritas filia temporis" (Chas. E. Sayer). I have not read these myself, but the judges have done so most carefully, and I believe had no difficulty in coming to the decision they did.

The Essay Ignigenus (Richard Glazier) is very beautifully illustrated, but I understand the judges consider these essays show a tendency to become too much a mere catalogue of the illustrations, whereas literary power and merit is what is primarily intended to be rewarded in this prize.

The Soane Medallion.—This prize is now the most valuable one offered by the Institute, and open to all British subjects under thirty years of age. The amount has this year been increased from 50*l.* to 100*l.*, and the subject given was a severe one. A chapter-house to a cathedral, plans, section, and elevation to quarter scale, with full-size details, and an exterior perspective. The labour this entailed was considerable, and I have known of more than one who relinquished the task. Eight, however, have sent in designs which show a great deal of honest hard study and work. Two were so equal that the judges had considerable difficulty in placing one first, but, as you are aware, they finally placed "Abbotsbury" (Heber Rimmer) first, and "Red Cherub" (John Begg) second.

In considering the designs for a chapter-house one naturally turns to those in our own cathedral establishments, where we find the general form is octagonal, though by no means necessarily so. Canterbury and Ely and Norwich (before it was destroyed) had chapter-houses, parallelograms on plan, while that at Lichfield is an irregular octagon. The groining of most is supported by a central column and as a rule they are level, or nearly so, with the cloister, though Westminster Abbey and Wells are well-known exceptions.

Of the eight designs submitted four are octagonal, three are hexagonal, and one is more or less of a parallelogram. Several provide an ambulatory round the outside between the buttresses, which appears to have no particular use beyond extending the cloisters, and adding, as it undoubtedly does, to the picturesqueness of the exterior.

The design marked "Abbotsbury," to which the Soane Medallion has been awarded, is shown in an admirably worked-out set designed in a Late Decorated style. An octagonal building is raised some 8 ft. above the cloister level, is surrounded by an ambulatory at the cloister level, out of which open recesses which in any other position would have been chapels. The appearance of the exterior as seen in elevation is almost that of the apse of a great church. It is placed on the summit of a rocky eminence, which makes me regret that it does not grow out of its foundation more as the buildings do at Mont St. Michel; for instance, the perspective as shown could only have been taken from a similar rocky eminence adjoining, and the building hardly has the appearance of being designed for an unusual site such as this. The interior is vaulted without the aid of a central column, but a pendentive common in fan-vaulting is suspended from the centre, which I venture to think would have been better omitted, as it seems to suggest a central column which was afterwards thought better of.

Though the chapter-house is raised, no crypt is shown under, and which crypt, owing to the ambulatory, would have been in perfect darkness. The entrance to the chapter-house is very dignified and noble, and the whole design shows a good knowledge of the capabilities and treatment of Gothic work, and is most conscientiously worked out, though the detail hardly comes up to the small-scale drawings.

The design marked "Red Cherub" (John Begg), to whom a Medal of Merit has been awarded, is hexagonal on plan, with a central shaft, the style being a Late Perpendicular. A narrow passage here runs round outside the chapter-house, which appears to me useless, though it makes a very picturesque feature in the view, with its square little windows between the buttresses. The perspective is very well drawn, and cleanly washed in in monotone. A feature in the exterior has been made of the disposal of the water from the roof through and down the face of the buttresses, finally being discharged into the open by gargoyles,—a method which, if I am right in understanding it, would not be very dignified, nor, I think, an advisable way of disposing of the water from the roof. I am aware flying buttresses over aisle roofs were used in this way, but this is hardly a case in point. The great vault of the chapter-house is elliptical, and does not reach within 8 ft. of the tie-beams of the roof over; this space is, therefore, wasted, and would have better been thrown into the chapter-house. An elaborate timber roof is shown over, which might well have derived some support from the stone roof below. The sections of the entrance from the cloister are admirably drawn, and show much knowledge of Gothic,—as, indeed, does the whole design. As I am criticising, I should doubt the good effect of the hexagonal form, and wish the tracery and mullions were thicker and the horizontal division of the lights different; in the perspective the lights in the windows nearest the buttress in high light are in each case darkened, apparently for the purpose of throwing up the buttress, but the effect cannot, I take it, be natural, or therefore proper.

Another very interesting design is submitted under the motto "Sun"; this, again, is hexagonal on plan and treated in a later manner. The centre space is covered with a cupola, the centres of support to which are shifted from the angles of the hexagon to the centres of the sides, the small spandrel spaces thus formed outside the cupola being stone-vaulted in the usual manner, the cupola itself being left perfectly plain, no doubt for decoration. This is an ingenious arrangement, and would, I think, look well, the objection being that the weight of the cupola is thrown off the angle buttresses, which would probably be strong enough, to the intermediate ones, which would not. This cupola forms the actual roof of the building, with no other external covering. Had the author heard Mr. Somers Clarke's paper on Seville Cathedral, which was treated somewhat in this way, he would probably have thought better of this. In this country a further difficulty would arise, inasmuch that when the building was heated the condensation would make it practically uninhabitable. On the exterior the want of a roof is much missed. The arrangement of entrance and steps is charming, though it hardly grows out of the requirements; but the whole design shows great originality and power of treatment, and we shall look forward to further work from the same hand with interest and expectation.

"Volunteer" sends a Renaissance design octagonal on plan, surrounded by buildings some 20 ft. wide, used partly as a library, and which would cut off far more of the chapter-house than shown on the perspective; the lighting is deficient, the central eye with a cupola over it being of little use for this purpose. I think also if the author had considerably increased the height of this chapter-house he would have added much to its effect in the interior and exterior.

"Byzantium" sends a clever design, but from the colour of the sky in the perspective it is presumably not to be erected in England. The author could, I think, hardly have expected to carry off the prize with this design; it undoubtedly has good points in its particular style, and the perspective is well and powerfully coloured, but the immense labour spent in etching up the sections and plan, which is contrary to the rules as I read them, might certainly have been better employed.

"Blue Griffin in Circle." A clever Renaissance design, octagonal on plan, covered internally with a plain vault, with suggested decoration most admirably shown. A very well-tinted perspective shows the exterior, but the parapet and niches externally are, perhaps, rather restless, and the detail hardly comes up to the rest of the work.

"Ex Cathedrâ" has not been afraid of plenty of wall-space—a good feature—but the decorative portions might have been more studied. A very good internal feature, as it seemed to me, is a gallery running round, which would be very effective, and might be useful on occasions.

"Plume," another hexagonal plan, has a cleverly-treated exterior, shown in a powerfully-drawn perspective. The triangular buttresses, with their arch moulds dying upon them, might be made a very effective feature, and the parapet without a cornice below it is a novelty. The detail shows profiles only.

"Anno 1891." A very good design, admirably worked out; and, with some of the labour spent on the design which has been spent on the perspective, it might have become one of the best in the room. I don't feel equal to say anything about the perspective. It is clever, no doubt, but that sort of thing has been done before. If the author contemplates another such, and would take my advice, I should certainly say "Don't." The motto of "Anno 1891" on such a drawing is out of place; it is at least 500 years before that.

The Tite Prize.—A design "For a Church Steeple," according to the principles of Bramante, Palladio, or Sir William Chambers. Four designs were sent in for this, and the prize has been awarded to "Red Lion" (T. R. Kitsell) for a very good design after the manner of Wren or Chambers, Bow Church in Cheapside, apparently, being the model. The perspective hardly does justice to this design. The detail is strongly drawn, and with great feeling. The section is careful and interesting, but hardly satisfactory constructionally. There are no less than four complete stone cupolas to carry the various stages, and these in many cases are heavily weighted, while I do not see any ties to take the thrust. I took the opportunity, through the kindness of the architect, Mr. Innes, to go up the Bow Tower the other day, and I should strongly recommend Mr. Kitsell and all students to take the opportunity of an Association visit to inspect it. This spire, as all know, is constructed on a single elongated cone most securely tied to the springing. The whole is a splendid piece of work, composed entirely of Wren's favourite materials, Portland stone and English oak, easy of access throughout, and perfectly sound.

"Ashlar" is another Wren or Chambers design. The circular spire is very small, increasing the difficulty of construction, and requiring stronger terminals than are shown at the angles.

"Quis" is a carefully-drawn design, but the subject is rather beyond the candidate's power. He requires a greater knowledge of detail, and will no doubt do better another time.

"Design in a Circle" is a capital Renaissance design, reminding one somewhat of St. Mark's, Venice, presumably after Bramante, and shown in a well and firmly-drawn perspective. The figure drawing is first-rate throughout. The detail is disappointing, probably through want of time. For the safety of the structure I should say the bells are hung too high.

The Grissell Gold Medal.— Three sets of drawings were submitted for a "Stone Railway Bridge," the prize being gained by "Jacta est alea" (Harold Harlock) for a design admirable in its simplicity, as such a structure should be. The calculations are carefully gone into, and the judges had no difficulty in awarding the prize

"Equilibrium" is another simple and very good design; but in order to maintain its motto, the foundations even if on rock should surely go down below the river bed.

"Fundamentum forte opus sustinct" is a good design spoilt by unnecessary abutments at the springings of the arch, which could be no use and interfere with the continuous intrados of the arch, which should be naturally the most effective feature of the design.

The Masonry Prize.—The judge here had no hesitation in awarding the prize to "Saxum" for his drawing and model, which he states are admirable, and show a perfect knowledge of the subject; "Voussoir" is also very carefully worked out.

The Godwin Bursary.—Four applications for this were received, Mr. T. Locke Worthington being successful. I may give students a hint that, in applying for this, they would do well beforehand to consider carefully the subject they propose to take up if successful, and then to show that they have prepared themselves by preliminary study to take advantage of what they may see abroad in connexion with the subject; foreign travel without preliminary study is of little worth.

I have now been through (very imperfectly, I am afraid) all the work submitted this year. I think the Institute may be proud of it, and probably those who have not got prizes would

be the first to admit they have got much benefit by the work. It would have been a more congenial task to me to have pointed out only the merits of these drawings, but I suppose a critic's duty is to criticise. I have spent a good deal of time among these drawings, and am much impressed with the ability shown in practically all of them.

In a short time the competitors will be competing in a still more important sphere, and either encumbering or beautifying the face of this fair world of ours with their buildings. If the promise of their draughtsmanship of to-day is fulfilled in their buildings of to-morrow, we may be very hopeful of the architecture which is yet to come.

The President said they would all agree with him in thanking Mr. Webb for the admirably exhaustive and critical notes which he had made upon the competition drawings. Those criticisms would be particularly useful because they referred not only to the drawings submitted by prize winners, but to the other drawings submitted. He had listened with great interest to the remarks made by Mr. Webb, and he would recommend the students to take them to heart. Friendly criticism was always valuable, especially when coming from one so competent to offer it.

Mr. John Slater, in proposing a vote of thanks to the President for his address, said that while they must all agree with the remarks made by the President concerning Mr. Webb's criticisms of the drawings, they must also acknowledge the merit of the President's own address. He was sure that they must all have been impressed by what the President had said as to the art of planning, and if those who were present that evening were to take to heart what he had said, it would be to their advantage in the future.

Mr. Charles Barry, in seconding the vote of thanks, said that the President's address was made to students, but he thought it contained some excellent advice which would appeal to those who, perhaps, like himself, no longer thought they were students, although, in point of fact, there was no time in the life and practice of an architect at which a man was not a student. In that sense the address would be of value to them all. He had been interested in hearing the catalogue of subjects which the President had given them, the study of which was to give them relief in their occupations; but the President had omitted one subject which was of great interest, viz., the study of the characters of clients, both single and corporate. He would strongly recommend them not to neglect that form of diversion. Diversion of that kind was frequently very necessary. The President had, he was sure, every reason to believe that planning was an art, for it was well known to most of them that the plans which had emanated from his hand, as well as from the hand of his old master Mr. Burn, were models of the most careful study of adaptability to the purposes concerned. He thought they must all feel the force of the President's observation that no man could make a good plan without picturing in his mind what the elevation would be and what the character would be, and without regarding its adaptability to the purpose for which it is intended.

Mr. Slater then put the vote of thanks, which was unanimously agreed to.

The President, in acknowledging the vote, said, in reference to Mr. Barry's remark about the study of character, important and interesting as that study was, and although some part of an architect's success depended upon the tact which was displayed in dealing with clients, still it was hardly a matter which formed part of the subject of planning. If he had lifted the idea of planning out of the too prosaic level in which it was too generally placed, and if he had led any of them to regard it as an artistic study, he was much more than rewarded for the time which he had devoted to his address.

The President then proceeded to present the prizes for 1892, a list of which appeared in the *Builder* last week, page 59.

The meeting then terminated.

LIFT AT THE METROPOLITAN TABERNACLE.—A hydraulic lift is to be fitted up at the Metropolitan Tabernacle to take Mr. Spurgeon from the yard up into his Vestry or down into the Lecture Hall. Messrs. Easton & Anderson, Ltd., are constructing the lift, which, it is stated, will be the first lift ever erected in a place of worship, at any rate in this country.

ARCHITECTURAL SOCIETIES.

BIRMINGHAM ARCHITECTURAL ASSOCIATION. On the 19th inst., a paper entitled "Four Suffolk Churches" was read before this Association by Mr. Paul Waterhouse, A.R.I.B.A. The churches dealt with by the lecturer were those of Southwold, Blythburgh, Covehithe, and Walberswick, of which the two latter are for the greater part in ruins. Mr. Waterhouse detailed something of the history, characteristics, and present state of these churches, and dwelt on the marked peculiarities which emphasise the church work of the particular period and locality represented by them. The lecture was illustrated by photographs, and by sketches, mostly the work of the author, though some were by Mrs. Paul Waterhouse. In explanation of the building methods of the early fifteenth-century, quotations were made from Gardner's "Dunwich" (published in 1735), which preserved, among other miscellaneous information on the buildings of the neighbourhood, a *verbatim* copy of the contract for building Walberswick Church, bearing date "the fourthe yeere of King Henry the Sexte." The lecturer pointed out as two prominent features of the procedure of the time, the absence of an architect and the explicit directions that the various details of the design were to be imitated from such points as were most admired in the then existing churches of the neighbourhood. Mr. Waterhouse dwelt on the terrible architectural results of the Cromwellian iconoclastic fury, which was particularly savage in the Eastern Counties, and concluded his paper with an imaginary picture of the glories which must have existed before the destruction of those days.—In proposing a vote of thanks to Mr. Waterhouse for his able paper, Mr. W. H. Bidlake said that the county in which the churches described lay was one which, from its historical associations and from the fact that it was a county which had, from being the seat of a wealthy commerce, become the scene of agricultural pursuits, appealed strongly to the imagination. The severe outlines of the churches of the Eastern Counties appeared to him particularly impressive, standing, as they did, in the wide, flat lands of the district, and the churches had great apparent stability, notwithstanding the weakness caused in appearance by the almost continuous clearstory windows. The vote of thanks was seconded by Mr. Doubleday, and supported by Mr. F. Barry Peacock (Vice-president), Mr. W. Hawley Lloyd, and others, and was unanimously passed.

CARLISLE ASSOCIATION OF ARCHITECTS, ENGINEERS, AND SURVEYORS.—The usual fortnightly meeting of this Association was held on January 12, when Mr. J. Rush Dixon, C.E., of the City Surveyor's Department, read a paper on "Road and Street Formation." The laying out and various modes of formation of streets, with their footways, kerbs, channels, and carriageways were fully described. The lecturer also gave a specification of the materials and formation of footways of gravel, tar, asphalte, cement, brick, and flagging, and of carriageways by macadam, tar-paving, asphalte, concrete, and stone-pitched pavements. The advantages, durability, cost, and disadvantage in each system were given, and the various thickness of material illustrated by drawings.

GLASGOW ARCHITECTURAL ASSOCIATION.—The usual monthly meeting of this Society was held on the 19th inst., when a paper on "Electric Lighting" was read by Mr. Alexander, electrical engineer. After an introductory notice of the extraordinary development within the last few years of the practical application of electricity to lighting, a short history of the first discoveries by Davis and Faraday was given. From laboratory to workshop he passed, and described the varieties of dynamos. The measurement of the force transmitted from producer to consumer was of the greatest commercial importance; this was described, and also the safeguard against fire or dangerous shock afforded by means of fuses that readily melt and at once cut off connexion upon any dangerous increase of electrical power. The three-wire system, by which the public will be supplied from the Corporation central stations, was described. Finally, a specification was given of the requirements in appliances of a private house having 100 lights, with the approximate cost. Throughout the lecture experiments were made, apparatus and specially-prepared diagrams being shown; and at its close a hearty vote of thanks was awarded to Mr. Alexander.—The following resolution anent the proposed Buildings Regulation Bill was then submitted as the outcome of a special meeting held last month, and revised by committee:—"The Glasgow Architectural Association, having considered the draft of the Glasgow Buildings Bill, while approving of its general purpose, believe that many of its provisions are inimical to the interests of architecture in Glasgow, and consider that a number of the by-laws in the schedule annexed to the Bill are most unpractical and unscientific in their relation to building construction; also, that it is very undesirable to promote any new Building Act which maintains the unskilled character and empirical procedure of the Dean of Guild Court, and does not provide for some form of control by qualified District Surveyors or otherwise, and for appeal in certain matters to a skilled and competent tribunal." The resolution, having been duly moved and seconded, was unanimously carried."

LIVERPOOL ARCHITECTURAL SOCIETY.—On the 25th inst., at the meeting of the Liverpool Architectural Society, in the Royal Institution, the Rev. F. F. Grensted delivered the third lecture of his series on "Egypt, the Home of the Early Arts," and dealt with the rise of civilisation in Babylonia, showing by some interesting photographs of sculptural remains that the great characteristics of the people were pride, war, and field sports.

NORTHERN ARCHITECTURAL ASSOCIATION STUDENTS' SKETCHING CLUB.—The second annual social gathering and exhibition of sketches of this club, was held on Monday evening last, when eighty or ninety members and friends were present. The exhibition included the work done by members at the fortnightly excursions, and Mr. C. Spooner kindly lent his Royal Academy Studentship drawings, which were greatly admired by those present. The President, Mr. W. S. Hicks, in opening the proceedings, congratulated the members on their work during the past year and his compliments were endorsed by Mr. Archibald Dunn. A programme of vocal and instrumental music was given by the members and their friends.

THE ARCHITECTURAL ASSOCIATION (DISCUSSION SECTION).—The last meeting of this section was held on the 20th inst., when Mr. A. H. Clark read a paper on "English Spires," dealing principally with their various forms and æsthetic qualities. The special Visitor for the evening was Mr. Philip J. Marvin, who, having had unusual facilities for studying the actual erection of spires, was able to give some most useful information. The paper was well illustrated by Mr. Clark's own sketches, principally from that county of spires—Northamptonshire.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday afternoon last, the Chairman, Sir John Lubbock, presiding.

Mode of Repayment for Local Loans.—The greater part of the meeting was occupied in the discussion of the following report of the General Purposes Committee as to the mode of repayment for local loans:—

"We have had under consideration the question as to the mode in which loans advanced by the Council to local bodies should be repaid. The Council is aware that as a rule the loans advanced by the late Board and the Council to Vestries and District Boards are repayable by equal annual instalments of principal, and the interest quarterly on the amount outstanding. The loans vary in period of repayment from 5 to 15 years for paving, 20 to 30 for works and buildings, and 60 years, or approaching thereto, for land and improvements to streets and bridges. This mode of repayment provides that in cases where there is the least outlay for repair and maintenance (*i.e.*, at the commencement of the loan), the work having but just been completed, there shall be the largest payment of principal and interest together, and the smallest at the end of the term, when the cost for repair and maintenance is necessarily increased, the two thus fairly balancing each other. In addition however to this, the payment of the interest quarterly provides the means to meet the quarterly payment of dividends on the Council's stock, which, when not thus provided, have to be obtained temporarily from other sources.

As regards loans to Guardians, whose power to borrow does not extend beyond 30 years, the case is different. The Metropolitan Board was first authorised to advance these loans by the Loans Act of 1875, and in 1876 the Local Government Board was requested by the Guardians of St. Marylebone to obtain the sanction of Parliament

to an extension of the period for loans to Guardians. The Local Government Board did not deem this course expedient, but desired the late Board to meet the case by allowing Guardians borrowing them to repay their loans by way of annuity. To this the Board assented, and the loans for new workhouses or new additions have been made repayable by the annuity system, when sanctioned by the Local Government Board, ever since.

Having regard to the near dissolution of the Council, we do not think it desirable that the course hitherto followed should be altered, nor that it should be the rule to make loans, for whatever period of currency, repayable on the annuity principle; but that they should be repaid on the lines previously stated. We think also that it would be well to settle the question, and we therefore recommend the Council to pass the following resolution—

'That the terms as to repayment on which loans were made prior to December 15 shall remain unchanged during the remainder of the Council's term of office.'"

Mr. Campbell moved, as an amendment,

"That the Council, under the circumstances, holds it inadvisable to pass any general resolution on the subject, and is of opinion that each application for a loan should be considered and decided on its own merits."

After a long discussion, the amendment was rejected by 44 votes against to 39 for it,—a majority of 5 votes against.

Mr. J. Williams Benn moved, as a further amendment,

"That the consideration of the subject be adjourned until after March 5."*

This amendment was seconded by Mr. Dickinson, and carried by the narrow majority of 1,—43 for to 42 against.

Site for the Proposed New Offices for the Council.—The Offices Committee presented the following report:—

"The Council, on Jannary 28, 1890, passed the following resolution:—

'That it be an instruction to the Council Chamber and Offices Committee to consider and report as to acquiring a suitable site for a Council Chamber and offices, having also regard to any site which already has erected upon it buildings of a character likely to be available for the purpose.'

We have from time to time given careful attention to the matter, and we now report for the information of the Council that we have under consideration three sites, either of which, subject to price, would be suitable for the erection thereon of new offices for the Council. We are, however, unable to proceed further until the Council gives us authority to enter into negotiations. We accordingly recommend—

'That we be authorised to enter in negotiations with regard to the sites referred to, and to report the result to the Council.'"

The recommendation was agreed to without discussion, and after transacting other business the Council adjourned.

COMPETITIONS.

WHITWORTH INSTITUTE, MANCHESTER.—In the first competition for the Whitworth Institute at Manchester, the assessor, Mr. A. Waterhouse, R.A., has recommended the following three designs for premiums, in the order named: "Terra-cotta (No. 2)," by Messrs. T. W. and R. F. Beaumont; "Floreat Mancunium," by Mr. Archibald Neill; and "Three Sisters," by Mr. Geo. Freeth Roper. From what we hear, it seems doubtful whether anything further will be done on the lines of this competition, as circumstances have occurred to alter the views of the promoters, and the scheme, if carried out, will probably be much modified.

NOTTINGHAM MASTER BUILDERS' ASSOCIATION.

THE annual meeting of the Nottingham Master Builders' Association was held on the 22nd inst. at the Mechanics' Institute, Mr. J. W. Woodsend presiding over a large attendance, in the absence of Councillor Wright (President). The following are the objects of the Association:—The consideration and discussion of all questions affecting the building trades; the promotion of excellence in the construction of buildings, and just and honourable practices in the conduct of business; the adoption of equitable forms of contract and encouragement of settling disputes by arbitration; the providing of facilities for social intercourse between the members of the Association and their friends, &c.

After the general business had been disposed of, and the officers elected for the ensuing year, notices from the Bricklayers' and Labourers' Societies asking for an advance of wages and code of working rules were read and discussed.

It was the unanimous opinion of the members that the present state of the building trade in Nottingham did not justify any advance on the present rate of wages.

* That is to say, until after the election of the new Council, which is fixed for that date.

Books.

Principles and Practice of Plumbing. By S. STEVENS HELLYER. London: Geo. Bell & Sons. 1891.

MR. HELLYER is so well known as a writer on matters connected with the plumber's craft that it is not susprising to find that he is the author of the volume on that subject in the series of technological handbooks edited by Sir H. Trueman Wood, and the choice is sufficiently justified by the extensive and thorough knowledge which Mr. Hellyer possesses of all kinds of plumbing work.

We regret, however, to find in this, as in other books written by Mr. Hellyer, that he is too much addicted to attempts at humour, which savour somewhat of vulgarity without being amusing. We can excuse Mr. Hellyer for his very natural expression of his opinion that his own manufactures are superior to those of his competitors in trade, but we should very much more enjoy the useful information which he gives us if he would not try to be funny.

Mr. Hellyer commences with a description, or rather illustrations, of the tools employed by the plumber, and then proceeds to tell us something of the history and manufacture of lead. In connexion with this he gives a very useful table, for which we have searched in vain in many other works on plumbing, of the weight of different lead pipes according to their substance. Some particulars about tin and its connexion with plumbing are also interesting and useful, as is also the description of soldering and lead-burning apparatus. The author then proceeds with a very excellent account of the execution of the various parts of the plumber's work applied to roofs, which will be of very great service as an addition to the practical experience of young plumbers, and also furnish for their employers many useful hints amongst which is a table of the different thicknesses of lead to be employed on the different parts of a roof. The description of bossing is very well treated, and the chapter on roof cess-pools is particularly minute and careful. We are specially glad to note the emphasis the writer lays on the importance of avoiding solder as much as possible in roof work, and also his advocacy of overflow-pipes from cess-pools. In the description of hips and ridges there is an omission which might be well supplied in any future edition. The author assumes that lead hips and ridges are universally formed over wood rolls, and omits to make any mention of the devices so frequently employed in our days for constructing hips with the lead work covered by close-cut slates. In speaking of rolls we notice that Mr. Hellyer advocates the keying of lead into the acute angles by the diminished roll rather than the right-angle junction employed by some practical men.

Very helpful to those readers, whose minds are not of a high mathematical order, will be the explanation of the manner of calculating the number of soakers for any particular piece of roofing. Another example of careful attention to minute detail is the description of a good method of constructing a torus moulding to a lead flat, a matter which is often not so skilfully arranged as it should be.

Leaving the subject of external plumbing, the author then proceeds to internal work, commencing with a full account of the various joints and the methods of making them. Mr. Hellyer defends the use of copper-bit and blow-pipe joints, though he is rightly careful to limit their application to special circumstances only; we should like to see also considerable emphasis laid upon the necessity for the workmanship of these joints being very accurate and careful, even in the limited number of cases where they may be used. Following the subject of joints comes that of bends, and we are glad to see that the author rightly condemns the use of mitre joints instead of bends. Any plumber who values his reputation as a craftsman should never make a joint where a bend serves the purpose. Apart from the question of skill, it will be within the experience of some of our readers that plumbers occasionally make joints for the mere purpose of charging for them, even, as we have sometimes known, if they have to cut a pipe in a half to do it.

Mr. Hellyer then once more gives us his views on the subject of traps, many of which, as he frankly says, have already appeared in other of his writings.

The chapter on lining cisterns and sinks with lead is well and carefully teated; and Mr. Hellyer then proceeds to treat in detail the plumbing work connected with soil-pipes, water-closets, sinks, baths, and lavatories, his views and practice as to which are well known to most of our readers.

The work finally concludes with some chapters on house drains, which do not, of course, profess to treat the subject so fully as Mr. Hellyer has done in other of his works.

Architectural Perspective. By F. O. FERGUSON. London: Crosby Lockwood & Son. 1891.

IT is a great advantage for young architectural draughtsmen to have placed before them a clear and straightforward description of the way in which they may prepare architectural perspectives without going through the large amount of needless drudgery usually entailed by attending any school of art class on perspective after the South Kensington fashion.

Decidedly the best way for a young architect to learn so much of perspective as is necessary for him, is to get an expert draughtsman to give him two or three hours personal instruction; then, if he has a clear head of his own and a reasonable amount of artistic ability, he will be quite free of books and teachers for the remainder of his days.

For those who are unable to get this personal instruction, Mr. Ferguson's book will do something and enable them to make a fairly decent perspective without an undue amount of labour, but there are some points upon which the author would do well to obtain a few more wrinkles before he issues a new edition.

The best positions for the point of sight, picture plane, and consequently the measuring line, are not sufficiently explained. Mr. Ferguson's method of making the measuring line on the nearest angle of the building with his picture plane touching the same angle is not calculated to produce the best grouping. Further, the rule which the author gives, that the point of sight should be distant about three times the height of the building, is only one of the points that an expert takes into consideration, as will be seen from the large extent of the angle of vision which the author uses.

The most serious blemish in the book, however, is fig. 24 in Part I., where we have what is evidently intended to be an example of isometrical projection, but clearly showing that the author does not understand correctly what isometrical projection is, nor its advantages when properly used. We quite agree with the author's opinion that the diagram he shows "is extremely ugly"; this ugliness would vanish to a very considerable extent if the diagram were correct.

The plate which Mr. Ferguson shows of his finished drawing will hardly commend itself to embryo draughtsmen, who have the advantage of frequently seeing much better specimens of pen-and-ink drawing. Mr. Ferguson would do well to obtain the collaboration of some of our well-known experts in draughtsmanship to give an illustration of what is understood in our days as the artistic treatment of light and shade in architectural drawing.

Notes on Building Construction. Part I. New edition. London: Longmans, Green, & Co. 1891.

IN our review of the new edition of Part II. of this well-known students' manual, we called attention to the omission of certain chapters which had appeared in the first edition of Part II. We are glad to find that in the new edition of Part I., which has now reached us, these matters have been included, so that the important subjects of riveting, centreing, and the building up of timber beams, are now no longer omitted, as would appear from an examination of the new edition of Part II. only. The chapters on these subjects are practically the same as before with some few modifications and additions which have been judiciously made, and increase the value of the work.

The chapter on iron roofs has been practically re-written, and although the volume is intended for elementary students only, it virtually con-

tains information, well and clearly expressed, sufficient for the practice of certainly the majority of architects.

The inclusion of a so clear and thorough description of the construction of iron roofs in what is now the standard handbook for architectural students, cannot fail to render the use of iron for this purpose more general amongst the rising generation, who will no longer be led to look upon ironwork as something which is beyond their capabilities, and only to be employed with the extraneous assistance of a civil engineer.

The remainder of the work is almost the same as before. Some few additions, chiefly an increase in the number of illustrations, have been made, and will enable the "Notes on Building Construction" to maintain the high position it has reached as a manual for architectural students.

The Essex Review. Vol. I., No. 1, January, 1892. London: T. Fisher Unwin; Chelmsford: Edmund Durrant & Co.

THIS is the first number of a quarterly publication, the object of which is "to gather up into one publication all matters of permanent interest relating to the prosperity, history, and literature of the county." The idea is an excellent one, and the first number promises well for the future. It contains "Notes of the Quarter" in regard to a variety of subjects, including new churches and church restoration. The Rev. Thomas Rogers, Mus.Doc., furnishes well-written notes on what has been done in music in the county during the past quarter, and Mr. F. Chancellor contributes the first of a series of articles on "Essex Churches," a description (with an illustration) of St. Augustine's, Birdbrook. The housing of the agricultural labourer in Essex is the subject of another article, and various notes and queries, and notices of new books, are added. The *Essex Review* ought to be a publication of much interest to the inhabitants of the county, and certainly, if it goes on as it has begun, deserves their support.

"The Advertiser's A.B.C. and Press Directory" (London: T. B. Browne, 163, Queen Victoria-street), is a well-arranged and admirably printed directory of English, Colonial, and Foreign newspapers, which are well indexed. In some respects, however, the lists of foreign papers need revision. For example, there is more than one newspaper published at Dunkerque, and the one mentioned in the book, the *Phare de Dunkerque*, is a daily and not a weekly journal. The ordinary directory matter is prefaced by some interesting articles concerning the production and distribution of newspapers. Particularly interesting are the articles on "Special Newspaper Trains," "The Old Journalism and the New," "Lobby Men and Lobby Manners," and "The Gallery of the House of Commons."

Our trade contemporary *Timber* issued last week an interesting illustrated number entitled "Timber and Woodworking Machinery." It contains a great deal of information about timber, its production, conversion, and conveyance, and is very fully illustrated.

The Manufacturers' Engineering and Export Journal is the title of a new monthly journal the first number of which has been sent to us. It is published at 22, Paternoster-row.

We have received Messrs. Line & Sons' illustrated catalogue of wall-papers, glazing, &c. The illustrations of wall-papers show some good designs by Mr. Brophy, Mr. A. Silver, and others. There is also mention of an embossed wall-covering consisting of wood fibre embossed in hollow relief, "as lasting as the wall itself," and which may have an excellent effect in suitable regions; we do not approve of these relief papers for London houses: they collect and hold dirt. The particular design illustrated of this material is rather like "Japanese run mad," but no doubt it would have its admirers. The examples of combed wall surfaces in "Alabastine" suggest a good many possibilities of diaper surface decoration of a simple kind.

THE FIRST SUSPENSION BRIDGE IN ICELAND.—After twenty years of agitation, the first suspension bridge in Iceland has been finished. It spans the Ölves river, is made of iron and steel wires, and is 360 ft. long and 6 ft. wide, the height above the river being 60 ft. The cost of the bridge is 3,500*l.* It has been made in England by Messrs. Vaughan & Dymond, Newcastle, and placed in position by English engineers.

Correspondence.

To the Editor of THE BUILDER.

ADJOINING BUILDINGS.

SIR,—One cannot pass along any thoroughfare in London without being struck by the careless way in which architects, in designing their own buildings, treat adjoining ones. No attention is paid to the horizontal lines of floors, openings, or cornices on either side. The elevation is worked out in the office, without any reference to their neighbour's design, with the result that strings and cornices are either ruthlessly cut off and left unreturned, or jumbled into their own elevation, and thus spoil both buildings. The County Council, District, and parish Surveyors should all insist upon some definite rule to govern such cases, and then see it properly enforced. I cannot conceive anything easier for an architect to carry into execution.

A somewhat similar matter is the treatment of adjoining chimnies. Mr. Edis's successful building for the Junior Constitutional Club in Piccadilly is a case in point. Here the chimnies of houses on east and west sides are carried up, no doubt at the expense of the owners of the Club, in different material and design to the club, and effectually destroy the otherwise satisfactory appearance of the gables and chimnies of the club. Truly in this case to have so treated the adjoining chimneys both in design and material to accord with the club, would neither have been a difficult or an expensive work, and could not have been objected to by adjoining owners. R. J. W.

*** The problem is not quite such an easy one as our correspondent seems to think, though no doubt more attention might be paid to it in many cases.

FLOORING-BOARDS ON CONCRETE.

SIR,—If "Surveyor" lays a tongued floor directly on concrete, I think he will have trouble from dry rot. I have heard of ordinary floors, not tongued, being so laid, but how they have behaved I know not.

Let me caution "Surveyor" against carrying his coke-breeze concrete into the fireplaces. It is a very perfect conductor of heat. The heat will accumulate in it sufficiently to char any wooden skirtings or other combustible work, at quite a respectable distance from the fireplace. This I know from ocular demonstration.

I am not sure that coke breeze is a safe material to place even near flues. The mere admixture of cement with it does not entirely deprive the coke of its very combustible properties.

Another hint as to coke-breeze concrete. It is apt to scale off from below the flanges of any iron joists which may be embedded in it. I should, therefore, hesitate about plastering directly on to the concrete. Of course, the soffit can be battered and lathed. Possibly the same scaling-off may sometimes occur with other concretes. Possibly, too, a liberal use of cement may get over this difficulty.

The concrete, whatever the "aggregate" used, must have plenty of time to dry,—not always an easy matter when a building has to be rushed. The floor-boards may be cut and laid in place, and nailed later on.

Coke-breeze concrete has, of course, the advantage of being light, and of taking nails kindly. The disadvantages are, I think, those which I have cited, and also that, like all concretes made with porous material, it lets water through too freely; so the extinction of even a small fire may do a good deal of mischief. ANOTHER SURVEYOR.

January 25, 1892.

BOLSOVER COLLIERY COMPETITION.

SIR,—I am glad to see that your correspondent "H. G." has brought to light the conditions of the above-named competition; but he has, I think, missed one of the most beautiful points, for the whole seven houses, schools for 600, workmen's club, hospital, and co-operative stores are to be carried out for 3,000*l.*! I did not return my particulars, but have kept them as a sad memento of what our profession has fallen to, and whenever I feel unduly elated by success I shall get them out and read them through. J. H. H.

THE ENGLISH IRON TRADE.—The most important feature in the English iron market has been the drop of 4s. in the price of Scotch warrants. The result has been the disorganisation of the small amount of legitimate business being transacted, buyers holding back until the market becomes again settled. Heavy sales of Cleveland and hematite warrants took place on Monday, on the reduction in the price of Scotch warrants being published. There is less doing in manufactured iron and common bars, and black sheets are 2s. 6d. and 5s. lower respectively. Tinplates are quiet; but the improved tone continues. There is very little change in the steel trade. Shipbuilders are still busy, and engineers maintain fair activity. The coal trade is somewhat quieter.—*Iron.*

The Student's Column.

WARMING BUILDINGS BY HOT WATER.

V.

ARRANGEMENT OF PIPES. AIR IN PIPES.

(HORTICULTURAL WORK.)

IT is sometimes questioned as to where the vertical portion of the return-pipe should be situated, and likewise, upon the same grounds, where the vertical portion of the flow should be. As a rule, both are near to, or directly in, the boiler, this being convenient, and it is also the correct position, although the majority of workmen would be quite at a loss to explain why.

It has been shown that the circulation is wholly dependent upon the difference of gravity or weight between the water in the flow-pipe and that in the return (the vertical portions of the pipe, not the horizontal, which have no assisting effect), and the greater this difference the more effective or strong the circulatory movement will be. There are two ways of increasing this difference in weight in the two vertical columns, viz., by increasing their height, as will be understood (a means not available in the low-lying horticultural works), and by increasing the difference in temperature of the two columns of water, for we have shown that a variation in temperature is a certain variation in gravity or weight. The former method applies to buildings, in which the pipes commonly extend up great heights, and at all times higher than in greenhouse work. The latter method will explain why the vertical portions of the pipes in a horticultural apparatus should be near the boiler in the following way.

If an apparatus is erected as fig. 13, which is the approved way (the extent of pipes and

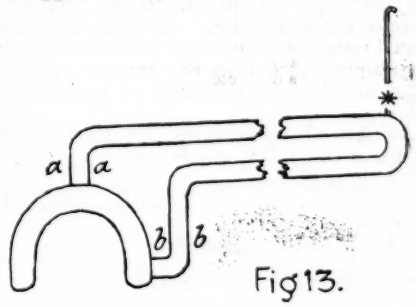


Fig 13.

branches do not affect this explanation), we shall get the hottest water as it leaves the boiler, in the vertical portion of the flow pipe, *a*. As this water travels on and along the horizontal pipe, it loses heat (as it is intended to do), and becomes of an increased weight, until, as it is upon the point of entering the boiler again by the pipe *b*, it is of its greatest density, and differs the most from the water in the pipe *a* in temperature, and consequently weight. Therefore, if it is the difference in weight of the water, and this is only effective in vertical pipes, then near the boiler is the most effective position for them, for here, both in the flow and the return, we get the two extremes of temperature.

Sometimes it is argued that the vertical portion of the return should be at the opposite end to the boiler, as fig. 14, the supposed favourable

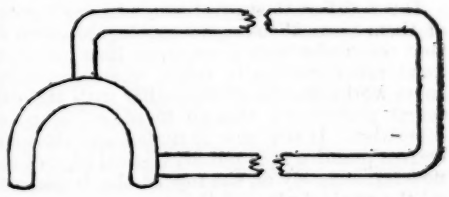


FIG. 14.

feature being that the fall, *i.e.*, the descent of the heavier water, occurs before it has to pass along the lower horizontal pipe; and, as a horizontal pipe is opposed to the circulation, by offering a certain resistance by friction, the descent occurring first aids in getting the water towards the boiler. But the least investigation shows that a loss is experienced in the fact that when the water falls at the further extremity of the apparatus, as fig. 14, it cannot be so cool as it would be near the boiler, as fig. 13. As (it will bear repetition) the circulation is dependent upon the water in this return pipe being heavier than the water in the flow-pipe

from the top of the boiler, it must be better to let its effective vertical part be where the water will be coolest and heaviest, that is, near the boiler, than for it to be away where the water has not lost so much heat.

In brief, the water is hottest in the pipe which leaves the top of the boiler and coolest in the pipe that enters the bottom of the boiler. By keeping the vertical (*i.e.*, the effective) parts of the pipes near these two points, we get the greatest possible difference in temperature, consequently weight and motive power.

Another argument to be heard occasionally, and worth mentioning, is that, by carrying the flow-pipe in the ordinary manner, but sloping the return all the way to the boiler, as fig. 15,

FIG. 15.

advantageous results are obtained by reason of the fall of water being free through the whole length of the return and no part horizontal. (It must be noticed by the way that this arrangement would be useless in a large apparatus, as it would not admit of branch services being connected very easily.)

This suggestion sounds very feasible, but it is nearly as valueless as the last. The fact of the return pipe being given this descent its whole length does not increase the aggregate distance it falls; that is, if the distance between flow and return pipes at the boiler be as in figs. 13 and 15, the actual fall given to the return pipes cannot exceed that distance in either case. Sloping the return all the way, as fig. 15, is a disadvantage from the fact that the descending force of water commences a long way from the boiler where the water has only lost a part of the heat it will lose before it re-enters the boiler. In other words, the actual result is as near as possible like giving an abrupt descent to the return, half way between boiler and extremity of apparatus, as fig. 16.

Another arrangement sometimes suggested is to make the pipes wholly returns, as fig. 17.

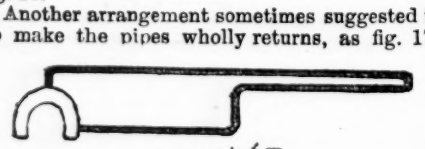


FIG. 16.

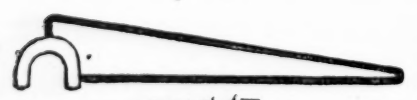


FIG. 17.

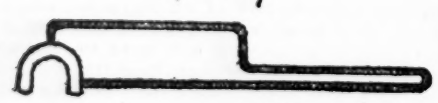


FIG. 18

From the information given, it will be seen that this is a worse arrangement than ever. In this case it is giving the water the fall or descent immediately it leaves the boiler when it is hottest, and it would give a worse circulation than any example yet given. It would practically amount to arranging the pipes as fig. 18.

These different suggestions, although some of them are next to impracticable, are given so that the reader may know what lines of argument are occasionally taken when discussing these works, and become familiar with the different phenomena that go to aid efficiency or otherwise. It will now be understood that the correct practice is to put all vertical pipe of the flow immediately on the top of the boiler, and all the vertical pipe of the return as near the boiler as it can be got. This arrangement is subject to conditions being favourable, and in any case allowance must be made for all pipes run in a horizontal direction having a regular rise from beginning to end.

AIR IN PIPES.

This, as before referred to, is a subject needing every consideration, for it frequently introduces real difficulties. Following the suggestion offered, we shall only now deal with the question as regards horticultural work. Its application to buildings will be treated in its place later. There is but little resemblance between the two, even as regards this subject, air tubes being used in one case, and air cocks in the other; and there are other differences.

In the first place, let it be understood that under any circumstances an air pipe must exist at the highest extremity, which is the furthest point from the boiler, marked * on fig. 13. This would suffice for a simple little apparatus like that one. If the works be such that branch services exist, which are carried in various directions, then each furthest extremity requires an air outlet; these extremities, it is understood, being the highest points in these different directions. It is hardly necessary to explain that air, being so much lighter than water, always seeks the highest position it can occupy, and there it will persistently stay. If, however, an air pipe be at that point, then there is no question of the air remaining, for it will instantly make its exit as the water fills the apparatus.

As an example, let us suppose a simple apparatus of two straight pipes which have the customary rise from the boiler, but in which the air-pipe has incorrectly been placed near the boiler, as shown in fig. 19. The proper

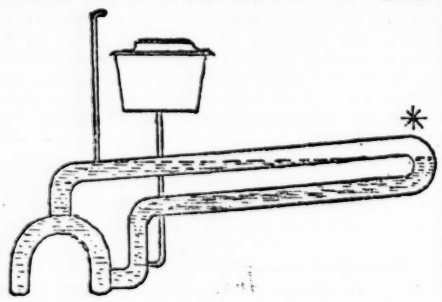


FIG. 19.

position for it would be where marked *. In this case, when first filling the apparatus, the water passing in from the small cistern shown, the pipes would gradually fill up until the lower aperture of the air-tube was covered, and then it would cease. This would leave the flow-pipe from the air-tube to * more or less charged with air, and it would require some rather strenuous efforts before it could be dislodged. Assuming it could be dislodged, the trouble would only be temporarily obviated, for water varying in temperature absorbs and expels air, and an accumulation would soon be formed again. If the air-pipe be shifted to *, the remedy would be complete; but until then the apparatus would be a failure. No circulation could be effected while this air was imprisoned.

If the accumulation of air was less, and did not wholly fill the extremity of the pipe, then the water would circulate, and if the apparatus was small, probably no particular ill results would be noticeable, but, if the apparatus be extensive, this fault would prove a check to the circulation until discovered. Air vents must be on the highest points, the points that the air seeks when the inflowing water begins to disturb it. We shall show in a later paper how this question often requires a good deal of consideration when pipes are dipped or run in irregular ways. It is quite useless imagining the air will find its way out if left alone, or that the water will manage in any way to displace the air, or occupy its place by some other means. When air is thus imprisoned (this word correctly expresses the state of things) there is no chance of matters remedying themselves without assistance.

SURVEYORSHIPS.

PARISH OF ST. PANCRAS. — The Vestry of St. Pancras, London, have appointed Mr. W. N. Blair, Assoc. M. Inst. C.E., the Borough Surveyor of Bootle, to the post of Chief Surveyor to their Vestry at a salary of 600*l.* per annum. There were originally seventy-three candidates for the position, and from these the Highways and Works Committee selected twenty-two for personal interview, after which they recommended for the consideration of the full Vestry the following six in the order of selection given: Mr. W. N. Blair, Borough Surveyor, Bootle; Mr. J. P. Norrington, Vestry Surveyor, Fulham; Mr. W. Howard-Smith, City Surveyor, Carlisle; Mr. J. P. Barber, Vestry Surveyor, Islington; Mr. G. J. C. Broom, Borough Surveyor, St. Helen's; Mr. H. Monson, Vestry Surveyor, St. James's, Westminster. These gentlemen accordingly had an interview with the full Vestry, who proceeded to select two of the number for final consideration, these two being Messrs. Blair and Howard-Smith, and after a discussion lasting over some hours, a ballot was taken, when Mr. Blair was found to have received the greater number of votes, and was, accordingly, appointed.

OBITUARY.

DR. ALFRED CARPENTER. —We regret to hear of the death, at Ventnor, on Wednesday last, of Dr. Alfred Carpenter, the well-known sanitarian, of Croydon. According to the *Times*, he was born in 1825, and was a native of Northamptonshire. He was educated at Moulton Grammar School, Lincolnshire, and studied medicine first at Northampton Infirmary, and afterwards at St. Thomas's Hospital, where, besides gaining the first scholarship ever given at that institution, he took the Treasurer's Gold Medal at the end of his course. Dr. Carpenter had long been known as an advocate of sanitary reform. In 1859 he became a member of the Croydon Board of Health, and he was Examiner in Public Health to the Universities of London and Cambridge. In 1881 he was appointed to serve on the Royal Commission which inquired into the condition of the London hospitals for smallpox and fever cases and into the means of preventing the spread of infection. Among his many works on sanitary subjects are "Hints on House Drainage," "The First Principles of Sanitary Works," and the "Physiological and Mechanical Aspect of Sewage Irrigation." We may add that many contributions from his pen on sanitary matters have appeared in the pages of the *Builder*.

MR. WILLIAM BASEVI SANDERS, late Assistant Keeper of the Records, died of bronchitis last week. When the Record Office decided, in 1861, to take advantage of the discovery of photo-zincography and to publish a series of facsimilies of the national manuscripts, Mr. Sanders was selected to take charge of the manuscripts, to see that the facsimiles made by the Ordnance Survey Department were correct, and to translate such documents as required translation. The facsimiles of Domesday Book; of the National manuscripts of England (4 vols.); of Scotland (3 vols.); of Ireland (3 vols.), of the Anglo-Saxon Charters (3 vols.); and of the Black Letter Prayer-book of 1636, with the translations and explanatory notes attached to them, are the result of his labours.—*Times*.

MR. W. FOGGIN.—On the 20th inst. the death took place of Mr. William Foggin, builder, of Newcastle. Deceased was sixty-nine years of age. Mr. Foggin was a native of Corbridge, but in early life he came to Newcastle. He had a large building connexion, says the *Newcastle Chronicle*. He built the Catholic Church of St. Andrew's, in Worswick-street, and also the Catholic schools at the Manors, the convent schools in Villa-place, the presbytery at St. Mary's Cathedral, the Freemasons' Hall in Maple-street, the Catholic Church dedicated to Our Lady and St. Oswin at Tynemouth, and a number of other public buildings in Newcastle and the district.

GENERAL BUILDING NEWS.

LONDON BUILDING LEGISLATION. — At the next meeting of the Royal Institute of British Architects, to be held on Monday, February 8, Mr. Edwin T. Hall is to read a paper on "London Building Legislation." The paper will be descriptive of the Suggestions of the Practice Standing Committee, adopted by the Council of the Institute, for the proposed Codification and Amendment of the Metropolitan Building Acts. The main lines of such suggestions are:—1. It is suggested that the details of construction, which are subject to variation from time to time by reason of, *inter alia*, new inventions, new materials, or modes of construction, &c., should be omitted from the body of the new Act, and be placed in schedules attached thereto, power being given by the Act to the County Council and to the Commissioners of Sewers, as the case may be (subject to provisions corresponding to those of Part II. of the Metropolitan Management and Building Acts Amendment Act, 1878), to vary these as occasion shall require, the object being to allow of changes in details of construction without the necessity of going to Parliament. 2. It is suggested that the new Act should be confined to and extend to everything within and enclosing the curtilage of a building, including any vaults under a public way; it is also suggested that it should include sanitation (*i.e.*, drainage, air spaces, ventilation, plumbing, &c.) and regulations respecting lines of frontage of buildings. 3. The construction of roads, sewers, and bridges, and of everything in the nature of public thoroughfares for use in common by the public, to be excluded. 4. Rights of light and air to be excluded, as they are in the nature of private property. 5. Restrictions on design, which are questions of taste, to be excluded. 6. Erections which are not buildings should be subject to control or supervision of district surveyors. Under this head would come: glass covers to yards, private bridges between buildings in one occupation, telephone and telegraph posts on buildings, wall signs, fowl-houses, and similar domestic structures, metal pipes for flues, &c.

NEW CHURCH, WESTCOMBE PARK, BLACKHEATH.—On the 23rd inst. the Church of St. George, Westcombe Park, was consecrated by the Lord Bishop of Rochester. The church is in the Early French style, and when completed, with chancel, tower, and spire, will cost 10,000*l*. The interior and exterior are faced with red bricks, relieved by Bath stone dressings and strings, and the roof open timbered. The floors are fireproof, and covered with wood-block flooring. The church has been erected from the designs of Messrs. Newman & Newman, architects, Tooley-street. by Messrs. Balaam Bros., of Shenton-street, Old Kent-road. The pulpit was executed in oak from the designs of the architects by Mr. A. Robinson, of Broad-street, Bloomsbury. The gasfittings are by Messrs. Gardener, of Bristol; and the heating arrangements by Mr. John Grundy, of City-road. The church is built upon the slope of a hill facing the river, and, when completed, will form a prominent feature in the neighbourhood.

SUNDAY-SCHOOL BUILDINGS, SKIPTON:—On the 12th inst. the new Congregational Sunday-schools erected in Otley-street, Skipton, were opened by Alderman J. Hopkinson, of Manchester. The foundation-stones were laid in August, 1890, and the premises have been built upon modern lines. The assembly-room, on the ground floor, contains a platform, and on each side there are six class-rooms, and there is a large room which will be used as a day-school for the infants. The assembly-room is encircled by a gallery, and on each side there are also four class-rooms. The building has been erected at a cost of about 3,000*l*. Messrs. Healey & Son, of Bradford, were the architects; Mr. B. Kirk, of Skipton, was the contractor for the stone-work; Mr. Smith, of Keighley, the joinery; and Mr. G. H. Mason, of Skipton, the plumbing and painting.

HOSPITAL EXTENSION, MIDDLESBROUGH.—On the 5th inst. a new wing, which has been added to the North Ormesby Cottage Hospital, Middlesbrough, was opened by Viscountess Falkland. On the ground floor of the new building there is a large room for out-patients, with a dispensary, doctors'-room, and a dressing-room. The second floor contains the nurses', day, and bed rooms, bath-room, and other conveniences. Mr. Thos. Dickinson, of Middlesbrough, has executed the work from designs of Mr. J. M. Bottomley, of that town. The cost has been 2,006*l*.

PUBLIC HALL, CWMAMAN, GLAMORGAN.—The new public hall at Cwmaman was opened by Lord Aberdare on the 25th inst. The building, which is constructed of stone, has been erected at a cost of 1,500*l*. Besides the hall, which is capable of seating 700 persons, there is a library, two reading-rooms, a room for games, and a billiard-room. The architect is Mr. T. Roderick, of Aberdare, and the builders Messrs. Powell & Mansfield, of Cardiff.

ALTERATIONS TO WYCLIFFE CHAPEL, DEVONPORT.—Wycliffe Congregational Chapel, Devonport, was re-opened on the 24th inst., after extensive alterations and repairs. The whole of the roof and a large portion of the western wall has been taken down. The roof has been lowered 10 ft., and the roofs over the aisles have also been altered so that their appearance might correspond with that of the main roof. The interior has been coloured and re-varnished. Mr. H. J. Snell was the architect, and the builder was Mr. J. Williams, of Stonehouse.

CO-OPERATIVE PREMISES, BROOMHILL, NORTHUMBERLAND.—On the 2nd inst. new business premises for the Broomhill Co-operative Society were opened by Mr. Albert Grey. The building, which has cost about 2,600*l*., has been designed by Messrs. Oliver & Leeson, architects, Newcastle, the contractor being Mr. D. M. Spence, of Amble. On the ground floor there are shops, and on the first floor there is a hall for public meetings, committee-rooms, secretary's office, &c.

GYMNASIUM BUILDING, HULME.—On the 6th inst. the Procter Gymnasium, which has been built on land in Silver-street, off Chester-road, Manchester, the gift of the Corporation, was opened for use by Lord Egerton of Tatton. The building has frontages into Silver-street, Pryme-street, and Southam-street, Chester-road, with two main entrances from Silver-street, one for members and the other for the public. The accommodation for members consists of a room, 100 ft. long by 50 ft. in width, lighted by a lantern light in roof and side windows. There are dressing-rooms and lavatories with slipper and shower baths, &c.; also three large fives courts leading out of the large room. A gallery is formed across one end of the large room and down one side to accommodate the public. Two reading-rooms, committee-room, and instructor's office are also provided, with kitchen and store-rooms in the basement. The building has been fitted with gymnastic apparatus by Mr. Renshaw. All the work has been carried out by Messrs. Wilson & Toft, contractors, from the designs and under the superintendence of Messrs. W. & G. Higginbottom, architects, of Manchester.

CANAL PROJECT IN FINLAND.—The Finnish Government has decided upon the canalisation and regulation of the rivers between Pielavesi and Jisvesi at an estimated cost of 28,000*l*., a large expenditure in that country. The depth of new waterway will be 6 ft. The work will occupy three years.

FOREIGN AND COLONIAL.

FRANCE.—The posthumous exhibition of the works of Ribot will be opened at the Ecole des Beaux-Arts in May. The monument to the painter, to be erected at Paris, has been entrusted to M. Rodin, sculptor.——In consequence of the extension to the Luxembourg of the Sceaux railway, the statue of Marshal Ney on the Boulevard St. Michel will have to be moved. This, which was the work of Rude, stands on the place where Ney was shot. It will be re-erected at the angle of Rue Notre Dame des Champs and Boulevard Montmartre.——M. Gustave Moreau, painter, has been appointed to the post of "Professeur Chef d'Atelier," formerly held by Delaunay.——A bust of the sculptor Aimé Millet has been erected at Père la Chaise. It was modelled by one of his pupils, M. Emile Guillaume.——A statue of Chevreuil, the celebrated chemist, is to be placed in the galleries of the Conservatoire des Arts et Métiers at Paris; it will be executed by M. Fayal.——M. Marius Vachon has been appointed Director of the exhibition of "Arts de la Femme" which is to be organised in August at the Palais d'Industrie, under the direction of the Union Centrale des Arts Décoratifs. Mdme. Rosa Bonheur will preside over the Fine-Art Section.——It is stated positively that the Minister of Public Works is at last about to submit to Parliament the long-delayed Metropolitan Railway scheme. The project will include, it is said, the completion of the Rue Réaumur, which is to connect the Rue du Temple with the Place de l'Opéra.—There is talk of the purchase by the Government of the site of the old Théâtre Italien (Place Ventadour) to instal there the Opéra-Comique. The building is at present occupied by a large financial establishment.——The Committee for the decoration of the Hôtel de Ville have commissioned M. Puvis de Chavannes to execute the decoration of the ceiling of the grand staircase, formerly given to Delaunay.——The death is announced of M. Guivogne, of Lyons, who was specially charged with the services of the Beaux-Arts and Architecture of that town.——At Biarritz a competition has been opened for a sea-bathing establishment on the beach, to cost about 600,000 francs.——In a field near Degoin (Saône-et-Loire) there has been discovered an interesting Roman burying-place, in which M. Veillerot, the antiquary, has found Gallo-Roman pottery, bronze bracelets, arms, and coins with the heads of Augustus, Nero, Vespasian, and Antoninus.——By a decree of the Conseil d'Etat, the town of Montpellier is condemned to pay to the architect of the Municipal Theatre, M. Cassier Bernard, the amount of his fees calculated at four per cent., with interest at five per cent. from May, 1888.——It is announced from Cairo that M. Grébaut, Director of Excavations at Tel-el-Amoma, has discovered a royal tomb of the eighteenth dynasty of Egypt. This tomb includes a gallery 50 mètres long terminating in a large rectangular apartment in which are found traces of painting of which the colour has faded.——M. Ernest Christophe, sculptor, has died at Paris, at the age of sixty-five. His principal works were "La Douleur," a marble statue now in the Tuileries Gardens; "La Fortune," in the Luxembourg Museum; and a sketch for a monument to his master, Rude, now in the Museum of Dijon.——The death is also announced, at the age of eighty-one, of Comte Emile de Nieuwerkerke, formerly "Superintendant des Beaux-Arts" under the Second Empire. He was a sculptor of merit, and had acquired a great many friendships by his amiability as well as his enlightened taste in matters of art.——One of the masters of French engraving, Louis Pierre Henrique Dupont, has just died at Paris, at the age of 94. We will refer more at length in our next "Letter from Paris" to the career of this eminent artist, only remarking now that he was, since 1849, a member of the Académie des Beaux-Arts, and commander of the Legion of Honour since 1878. He was, since 1863, Professor of Engraving at the Ecole Nationale des Beaux-Arts.

SYDNEY.—The tender for the erection of the Newcastle Cathedral, from the foundation already completed to the roof (which will be a separate contract), has been accepted. The architect is Mr. T. Horbury Hunt.

MISCELLANEOUS.

ELECTION OF THREE ASSOCIATES OF THE ROYAL ACADEMY.—At a general assembly of Royal Academicians and Associates, held on Wednesday evening last, Mr. Stanhope A. Forbes, painter, Mr. Harry Bates, sculptor, and Mr. T. G. Jackson, architect, were elected Associates.

RAWLINGS' EMERGENCY STAIRCASE.—This is a form of folding staircase intended especially to provide a means of exit from the upper floors of factories or other such buildings. A light folding staircase is connected with a trap-door in such a manner that when the trap-door is raised the stair is by the same action let down to the floor below. A handrail unfolds with it, extending sufficiently far down the stair or ladder to afford safety to children in descending. It is proposed that the trap-doors should be formed one over the other in each floor, at the farthest point from the permanent staircase, so as to afford an uninterrupted way down. Of course in a case where one floor or story was filled with flames and smoke it would not be of much use, as it would not pass the point of danger: an outside exit is the thing really wanted. In many cases, however, it would afford an available exit, and its comparative cheapness and the readiness with which it could be fitted to existing buildings recommend it to attention.

THE SANITARY INSTITUTE.—A list of lectures has been arranged by the Sanitary Institute for the special instruction of those desirous of obtaining knowledge of the duties of Sanitary Officers. The various subjects will be dealt with in the course of seventeen lectures, given by well-known authorities, and will be illustrated with diagrams, drawings, and models. These lectures are a continuation of the courses previously held by the Parkes Museum, and it is proposed to repeat the course in London twice each year, to suit the requirements of persons preparing for the examinations of the Institute. The lectures will comprise the subjects scheduled for these examinations, and will be given on Tuesdays and Fridays, commencing Friday, January 29. Students and others desirous of attending the lectures are requested to send in their names at once to the Secretary of the Institute, 74A, Margaret-street, W.

THE SORBONNE, PARIS.—An illustrated history of this famous College is in preparation by Mr. John A. Randolph, to be published by subscription. It will be completed in six monthly parts.

DESIGNS FOR FLOORCLOTH.—Messrs. M. Nairn & Co., of Kirkcaldy, are offering a number of prizes for the best designs for floorcloth and linoleum. The judges are to be Mr. M. B. Nairn and Mr. John Nairn, assisted by one of the examiners of the South Kensington School of Art. Designers on the staff of the firm are excluded from the competition.

SOCIETY OF ARTS.—In consequence of the illness of Prof. W. C. Unwin, F.R.S., the Howard Lectures on "The Development and Transmission of Power from Central Stations," which he was announced to deliver on February 5 and five following Friday evenings, have been postponed.

CHICAGO EXHIBITION.—The first meeting of the Electricity Committee was held on Tuesday afternoon, 26th inst. Present:—W. H. Preece, F.R.S., in the chair; Sir Frederick Abel, K.C.B., D.C.L., F.R.S., Colonel R. T. Armstrong, C.B., R.E., R. E. B. Crompton, Prof. James Dewar, M.A., F.R.S., Major-General E. R. Festing, F.R.S., Prof. George Forbes, M.A., F.R.S., Prof. G. Carey Foster, F.R.S., Edward Graves, Prof. D. E. Hughes, F.R.S., Gisbert Kapp, J. C. Lamb, C.M.G., W. M. Mordey, J. Fletcher Moulton, M.A., Q.C., F.R.S., Prof. John Perry, D.Sc., F.R.S., Alexander Siemens, Prof. Silvanus P. Thompson, D.Sc., F.R.S., with Sir Henry T. Wood, Secretary of the Royal Commission.

PRESSED-STEEL WINDOW-FRAMES.—The National Telegraph Works Company send us a description and illustration of these frames, for which they claim the advantage over cast-iron frames that they are produced at less cost, are less than one-quarter the weight, and do not require careful packing to ensure them against damage in carriage by rail and sea. Of the statistics as to weight and cost we can say nothing, merely giving the patentees' statement, but they are certainly likely to be stronger than cast-iron frames, and if all that is claimed for them is realised they certainly demand attention.

THE NINETEENTH CENTURY ART SOCIETY.—Saturday, February 6, has been appointed for the private view of the Spring Exhibition (the twenty-sixth) of the Nineteenth Century Art Society, at the Conduit-street Galleries, and the exhibition will open to the public on Monday, February 8.

THE RATING OF MACHINERY.—A conference, under the auspices of the National Society for the Exemption of Machinery from Rating, was held on Tuesday, at the rooms of the Manchester Chamber of Commerce. Sir W. H. Houldsworth, M.P., presided, and gentlemen attended from all parts of the country. The Chairman said at present the law was applied differently in different localities, and the decisions of the Judges had only made confusion worse confounded. Mr. W. Mather, M.P., said he thought it would be futile to re-introduce the old Bill into Parliament, and he was rather in favour of going in for seven-eights of what they wanted by supporting their No. 2 Bill, drafted by the Society, eliminating words so as to prevent rating of any machine which does not require any special foundation or special adaptation of the hereditament in connexion with the use of their particular machine. He moved an amendment accordingly, and Mr. H. D. Marshall (Gainsborough) seconded. Mr. Hughes (Sheffield), Mr. Bonser (Nottingham), and Mr. Tomlinson, M.P., supported the amendment. Mr. D. Rhodes said he thought the amendment would satisfy the Lancashire Poor-Law Guardians, of whom he was one. The amendment was carried by a large majority. The Bill to be promoted in accordance with their decision provides that machinery which is not fixed, or is only fixed to the hereditament for purposes of steadying it, and which, with the foundation thereof, can be removed without permanent injury to the hereditaments or itself, shall not be rated. Machinery for producing motive power, however, is excluded, and it is not proposed to apply the Bill to Scotland or Ireland.

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premium.	Designs to be delivered.
*Technical School Building	Heywood Corp.	20*l.* 10*l.* and 5*l.*	Feb. 15
*Floorcloths and Linoleum Designs	M. Nairn & Co.	15 amounting to 200*l.*	No date

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor or Engineer.	Tenders to be delivered.
*Waterworks	Buckingham U.S.A.	B. Latham	Feb. 2
*Pipe Sewers	Tottenham Loc. Bd.	J. E. Worth	do.
Four Shops and Houses, Pontypridd	D. R. Evans	A. O. Evans	do.
*Making-good Roads	Southend Loc. Bd.	Peter Dodd	do.
House and Six Cottages, Arthington	N. E. R. Co.	Wm. Bell	Feb. 3
*Purchase and Pulling-down Building Materials	School Bd. for London	*Official*	do.
Two Dwelling-houses, Dufftown, N.B.	P. M'William		do.
Footbridges	G. W. R. Co.	*Official*	do.
Sewerage and Road Works, Canton, Cardiff		Veall & Sant	do.
*Engine House, Pumping Station, &c.	Maidstone Wtrwks Co.	E. Easton & Co.	do.
*Works and Materials	St. John's Vestry, Hampstead	*Official*	Feb. 4
Joinery Fittings, Municipal Buildings	Plymouth Corp.	G. D. Bellamy	do.
*Goods' Sheds at Ilkeston, Beckford, and Redditch, &c. &c.	M. R. Co.	*Official*	Feb. 5
Additions and Alterations to Premises	Blaenavon (Mon.) Co-op. Soc. Ltd.		do.
*Broken Granite	Norfolk C. C.	T. H. B. Heslop	Feb. 6
Sewerage Works (Contract No. 1)	Idle Local Board	Woodhead & Son	Feb. 8
*Road Materials	H. M. Works	*Official*	do.
Bank and Residence, Chesterfield	Crompton & Evans' Union Bank	Rollinson & Son	Feb. 9
*Public Hall and Municipal Offices	Boro' of West Ham	L. Angell	do.
*Iron Gangway and Railings	Richmond Main Sewerage Board	J. C. Melliss	do.
*Works and Materials	Willesden Loc. Bd.	O. Claude Robson	do.
*Pipe Sewer, Drain, &c.	do.	do.	do.
*Works and Materials	Kingston Highway Bd.	A. J. Henderson	Feb. 10
*Removal of Dirt, Dust, &c.	Crown Estate Paving Commissioners	*Official*	do.

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Drainage Works	West Ham Union	J. M. Knight	Feb. 10
*Block of Buildings, Merthyr Tydfil	T. J. Masters, Esq.	T. C. Wakeling	Feb. 11
*Additions to Engine House	West London School District	*Official*	Feb. 12
Public Baths, Woodside, Haley Hill	Halifax Corporation	Horsfall & Williams	Feb. 13
*Erection of Workhouse	St. Giles, Camberwell, Guardians	Wilson, Son, & Aldwinckle	Feb. 15
Asphalting at Cemetery	Batley Burial Board	*Official*	Feb. 16
*Fire Brigade Station, East Dulwich	London County Council	do.	do.
*Works and Materials	Vestry of St. Margarets, &c. Westminster	G. R. W. Wheeler	Feb. 16, 17 & 18
*Public Baths	Shrewsbury Corp.	J. Johnson	Feb. 22
*Free Library	West Ham Council	Lewis Angell	Feb. 23
*Superstructure of Mill	Atherton Cotton Spinning Co.	Bradshaw & Gass	No date
Alterations to "Earl Grey" Inn, Newcastle-on-Tyne		B. F. Simpson	do.
Offices, Newcastle-on-Tyne	Prudential As. Co.	A. Waterhouse & Son	do.
Miners' Hall, Reading-rooms, &c. Silksworth, Sunderland	Wm. Palmer	H. Grieves	do.
Alterations and Additions to Netherall, Maryport	H. P. Genhouse	C. J. Ferguson	do.
*School Furniture	Sch. Bd. for London	*Official*	do.
*Public Library, Southampton	The Committee	do.	do.
*System of Drainage, Beverley Barracks	War Department	do.	do.
*Pair of Semi-detached Villas	Ramsgate Corp.	Hill & Co.	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Sanitary Inspector	St. Pancras Vestry	100*l.*	Feb. 4
*Inspector of Nuisances	Norwich Town Council	175*l.* &c.	Feb. 6
*Clerk of Works	Hove Sch. Bd.	3*l.* weekly	Feb. 8
*Cemetery Superintendent	St. Mary Islington Burial Board	150*l.* & residence	do.
*Surveyor and Inspector of Nuisances	Ashford L. B.	150*l.*	Feb. 16
*Sanitary Inspector	Vestry of St. Margarets, &c. Westminster	130*l.* &c.	Feb. 22

Those marked with an Asterisk (*) are advertised in this Number. *Competitions, p.* iv. *Contracts, pp.* iv., vi., viii. & ix. *Public Appointments, p.* xx. & xxi.

ROYAL CAMBRIAN ACADEMY OF ART.—At the annual meeting of the Royal Cambrian Academy of Art, held last week, Mr. Arthur Baker, F.R.I.B.A., author of "Plas Mawr," and architect to the Academy, was elected an Associate.

DISINFECTING APPARATUS.—The State Sanitary Department of Berlin has certain regulations as to disinfection of clothing, bedding, &c., and in order to meet these Messrs. Oscar Schimmel & Co., Chemnitz, have devised a disinfecting apparatus, which is described in a German contemporary. There are two forms, one having a chamber of rectangular section, and the other one of cylindrical form. A frame, to receive the things to be treated, is arranged to run in and out of the disinfecting-chamber on rails. The chamber is then closed, and the clothing is heated by steam, which is introduced by means of two copper coils. There is a separator by which all water is taken from the steam, and the chamber and its contents are heated to 70 degs. centigrade before free steam is allowed to be blown in. By means of valves the air is forced out of the clothing into the chimney, and the admission of air can be regulated. The clothing is then subjected to a temperature of 105 degs. centigrade during the space of one hour, by which time the heat has penetrated to the middle of even large bundles of clothing.

ROYAL METEOROLOGICAL SOCIETY.—The annual general meeting of this Society was held on Wednesday evening, the 27th inst., at the Institution of Civil Engineers, 25, Great George-street., S.W.; Dr. W. Marcet, F.R.S., Vice President, in the chair. The report of the Council for the past year showed the Society to be in a very satisfactory position. In May the library and offices were removed to more commodious premises at 22, Great George-street. After defraying the cost of fitting up the new offices and the increased rental, there still remained a balance in hand of 224*l.* Thirty-four new Fellows were elected during the year, the total number on the roll of the Society now being 552. Owing to the absence of the President, Mr. Baldwin Latham, M.Inst.C.E., through an attack of influenza, his address on "Evaporation and Condensation" was read by the Secretary. The question of evaporation, the author said, is as of great importance as the study of the precipitation of water on the face of the earth, as the available water supplies of the country entirely depend upon the differences between these two sets of observations. The earth receives moisture by means of rain, dew, hoar frost, and by direct condensation. It loses its moisture very rapidly by evaporation. Although evaporation mainly depends upon the difference between the tensional force of vapour due to the temperature of the evaporating surface, and the tensional force of the vapour already in the atmosphere, yet it is largely influenced by the movement of the air and by its dryness, or the difference between the dew point and the actual air temperature. Evaporation goes on at night so long as the water surface is warmer than the dew point. With sea-water the evaporation is about 4½ per cent. less than with rain-water, while with water saturated with common salt the evaporation is 15 per cent. less than with rain-water. Mr. Latham next described some percolation experiments which were carried out by Mr. C. Greaves at Old Ford, by Messrs. Dickinson & Evans at Hemel Hempstead, and by Sir J. B. Lawes and Dr. Gilbert at Rothamsted. He then detailed the results of his own experiments, and also the gaugings of the underground waters in the drainage areas of the rivers Wandle and Graveney. He further stated that in the course of his observations on the flow of underground water he had observed that at certain particular seasons of the year it was possible to indicate the direction and volume of the flow of underground streams, even when they were at a considerable depth, owing to the formation of peculiar lines of fog. Dr. C. Theodore Williams was elected President for the ensuing year.

THE PROPOSED NEW STREET FROM HOLBORN TO THE STRAND.—A meeting was held on Tuesday night at the Holborn Town-hall in order "to urge the London County Council to facilitate a necessary and direct route from north to south of London through the very centre of the metropolis." Mr. T. W. Maule, L.C.C., presided, and said the London County Council had favoured a scheme through Little Queen-street and Drury-lane, but all the proposals for improvements had been interrupted by the betterment question. In connexion with the proposed new street, however, two committees were sitting, and there were proposals to utilise Lincoln's Inn-fields. The latter proposition, he maintained, would mean a saving of half a million of money, and would result in the formation of a very beautiful street. Such a route would open up King's College Hospital to the public view, and would mean a very near cut from Holborn to the Law Courts. The route he advocated was *via* Vernon-place, Bloomsbury, Kingsgate-street, Holborn, Lincoln's Inn-fields, and Clare Market. Dr. Maybury supported the route detailed by the Chairman, and contended that it was the cheapest and the best in every way. Mr. A. H. Hoare, L.C.C., said that the Improvement Committee of the County Council decided in favour of the Drury-lane scheme. Mr. J. C. Dear estimated that the new street would cost 600,000*l.*, while the Drury-lane route would cost 933,000*l.* He moved a resolution cordially supporting the efforts of the Holborn Extension Committee to obtain a new street from Holborn to the Strand through Lincoln's Inn-fields, and expressing the hope that the London County Council would take early steps to carry out such a much-needed improvement. The motion having been seconded by Mr. Theobald, Mr. Fusedale moved a resolution in favour of the alternative route approved by the London County Council, and this was seconded and adopted by a large majority.

LEGAL.

CASE UNDER THE METROPOLIS MANAGEMENT AMENDMENT ACT, 1890:

WANDSWORTH DISTRICT BOARD *v.* BIRD.

In the Queen's Bench Division on Wednesday last, judgment was given in this case, which was heard on the 14th inst., and in which the Court had taken time for consideration. The case raised the question whether under the Metropolis Management Amendment Act of 1890 the District Board can absolutely refuse to the owner of land laid out or intended to be laid out in a street permission to excavate and remove sand, gravel, or subsoil under such land, or can only impose conditions on such removal. The statute (53 and 54 Vict., c. 66, s. 6) provides that it shall not be lawful to form or lay out any street from which the gravel, &c., has been excavated, until the subsoil has been made good and levelled, &c., and that it shall not be lawful to remove or take away sand, gravel, &c., from any land on which any street or road is laid out or intended to be laid out except on such conditions as to the making good the same as the Board may think fit. And if the Board shall refuse to give their assent or impose any conditions, &c., the owner, if dissatisfied, may appeal to the London County Council. In the present case the owner of a piece of land near the Wandsworth station of the Brighton Railway had proposed and intended to lay out a street or road, to be called Braybrooke-avenue, and had applied to the Board for power to make sewers, &c., and had proposed to excavate along the whole length for gravel, sand, &c., to be removed. He had on April 18 last applied to them to know what conditions as to levelling or making good, &c., the Board might desire to impose. On May 8 the Board Clerk wrote a letter in reply, that the Board had resolved to refuse their consent to the excavation of any part of the land for the purpose of removal of any subsoil, sand, or gravel. The owner, nevertheless, proceeded to excavate and remove a large quantity of gravel from the land. The Board took out a summons against him for excavating and removing subsoil without their consent in writing, but the magistrate (Mr. Haden Corser) refused to convict, and stated a case which raised the question.

The case was argued by Mr. Channell, Q.C., and Mr. Earl for the Board; and by Mr. R. Bray for the owner.

The Court had taken time to consider their judgment, which was now delivered in favour of the owner and upholding the view taken by the magistrate.

Mr. Justice Hawkins delivered judgment at some length to that effect. The Board, he said, had complained that the owner had removed subsoil in disregard of their refusal to allow it, and he contended that their consent was not required, and that they had no power to refuse to allow it. The real question is whether their consent was required and they had power absolutely to refuse it, or whether they could only impose conditions as to making good or levelling the soil. And, on the best consideration they could give to the Act, it appeared to them that the contention of the respondent, the owner, was good, and that no power was given to the Board absolutely to refuse to allow any subsoil to be excavated and removed, but only to impose conditions as to levelling and making good the soil. The learned Judge went fully into the provisions of the Act to support this view as to its construction, and arrived at the conclusion that the magistrate was right in not convicting, and the appeal must be dismissed.

Mr. Justice Wills concurred.

Appeal accordingly dismissed.—*Times.*

MEETINGS.

SATURDAY, JANUARY 30.

Royal Institution.—Professor J. A. Fleming on "The Induction Coil and Alternate-Current Transformer." II. 3 p.m.

St. Paul's Ecclesiological Society.—Annual Meeting. 2.30 p.m.

MONDAY, FEBRUARY 1.

Royal Academy of Arts.—Professor Aitchison, A.R.A., on "Saracenic and Turkish Architecture." III. 8 p.m.

Surveyors' Institution.—Adjourned Discussion on Mr. E. H. Morris's paper on "The Four-Course System." 8 p.m.

Society of Arts (*Cantor Lectures*).—Professor George Forbes on "Developments of Electrical Distribution." II. 8 p.m.

Society of Engineers.—(1) Presentation of Premiums. (2) Inaugural Address by the President, Mr. J. W. Wilson, Jun. 7.30 p.m.

Royal Institution.—General Monthly Meeting. 5 p.m.

Victoria Institute.—8 p.m.

Leeds and Yorkshire Architectural Society.—Mr. F. W. Bedford on "Spanish Architecture." 7.30 p.m.

TUESDAY, FEBRUARY 2.

Institution of Civil Engineers.—Mr. Alfred Harper Curtis on "Gold Quartz Reduction." 8 p.m.

Sanitary Institute (*Lectures for Sanitary Officers*).—Mr. H. Law on "Principles of Calculating Areas, Cubic Space, &c.; Interpretation of Plans and Sections to Scale." 8 p.m.

Glasgow Architectural Association.—Demonstration on "The Architecture of the Human Figure, and its Application," by Mr. F. H. Newbery. 8 p.m.

WEDNESDAY, FEBRUARY 3.

Royal Archæological Institute.—(1) The Rev. Precentor Venables on "The Roman Colonnade Discovered at Lincoln last Spring." (2) Mr. J. Park Harrison on "A Pre-Norman Clearstory Window, and other Early Work in Oxford Cathedral." 4 p.m.

British Archæological Association.—(1) Mr. Thomas Blashill on "Sutton-in-Holderness and the Abbey of Meaux." (2) Mr. Andreas E. Cockayne on "Dorothy Manners (*née* Vernon of Haddon Hall)." 8 p.m.

Carpenters' Hall, London Wall.—Professor H. Robinson on "Drainage of Buildings and Construction of Sewers." 8 p.m. (*Admission Free*)

Civil and Mechanical Engineers' Society.—Mr. J. F. Reade on "Main Drainage Extension in Towns." 7 p.m.

Institution of Electrical Engineers (*At the Royal Institution*).—"Experiments with Alternate Currents of High Potential and High Frequency," by Mr. Nikola Tesla. 8 p.m.

Society of Arts.—Mr. T. Pridgin Teale, M.A., on "Dust, and How to Shut it Out." 8 p.m.

THURSDAY, FEBRUARY 4.

Royal Academy of Arts.—Professor Aitchison, A.R.A., on "Saracenic and Turkish Architecture." IV. 8 p.m.

Royal Institution.—Dr. A. S. Murray, on "Some Aspects of Greek Sculpture in Relief." III. 3 p.m.

British Museum.—Miss Millington-Lathbury on "Greek Sacrifices and Priests," as illustrated by the monuments in the Museum. 2.45 p.m.

Institution of Mechanical Engineers.—Annual General Meeting, when two papers will be read. (1) Mr. J. Parry on "Mechanical Features of the Liverpool Water Works, and on the Supply of Power by Pressure from the Public Mains, and by other means." (2) Mr. W. Hawdon on "The Disposal and Utilisation of Blast-Furnace Slag." 7.30 p.m.

Society of Antiquaries.—8.30 p.m.

FRIDAY, FEBRUARY 5.

Sanitary Institute (*Lectures for Sanitary Officers*).—Mr. Louis Parkes on "Water Supply, Drinking Water, Pollution of Water." 8 p.m.

Institution of Mechanical Engineers.—Annual General Meeting (continued). 7.30 p.m.

Royal Institution.—Professor Roberts-Austen on 'Metals of High Temperatures." 9 p.m.

SATURDAY, FEBRUARY 6.

Royal Institution.—Professor J. A. Fleming on "The Induction Coil and Alternate-Current Transformer." III. 3 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

1,885.—ROOFS: *H. M. Symons.*—This invention refers to an improved method of repairing slated roofs by the employment of metal slips, made smaller on underside, to partly fit the bevelled edges of the under-slates, and thereby leaving a thicker substance of metal without raising the new slate more than ordinary. At the underneath side of one end of the slip a spike projects forming a nail. Nail and slip are thus in one piece, and a saving of time is effected in fixing.

2,153.—WATER-CLOSETS: *J. Smith.*—This specification relates to an improvement in the inlet or distributing water orifices of water-closet basins for the better distribution of the water for flushing and cleaning the basin. The novelty claimed consists in introducing the water to the upper part of the basin by three inlet openings instead of only by one as usual.

2,536.—CHIMNEY-TOPS: *J. Rae* and *J. Murdoch.*—To prevent back-smoke and back-draughts the chimney-can which is the subject of this patent has around its circumference, near the base, a series of openings so arranged that from whatever point the wind strikes the can, it enters through the openings, and is carried upwards towards the mouth of the can, thus causing a draught or suction in the chimney. About the middle of the can a similar series of openings is provided, causing a further draught in the chimney.

2,745.—WATER PIPES: *H. J. Minsharp.*—In a combination fitting, constructed with a stop-cock in the centre and two outlet sockets, either draw-off taps or plugs are inserted. The fitting is fixed to the service-pipe near the main, and is used to prevent the bursting of water-supply or service-pipes.

461.—DRAIN-TESTING: *T. Kemp.*—This patent refers to an improved apparatus for drain-testing, passing a chemical of strong odour into the drain without the aid of a machine. It consists of a small glass tube containing the chemical, fitted with a coil spring on the outside, and an india-rubber cap firmly held on the top of the tube by a paper tape passing over and attached to the spring which seals up the contents. On the tester being passed into a closet trap, the tape becomes wet in passing through the water, and is broken by the force of the spring, and the contents of the tube are discharged.

19,076.—WATER-CLOSETS: *T. Crapper.*—This refers to an improvement in the soil pipe connexions of water-closets. The inventor connects the earthenware trap of a closet basin with the soil pipe by means of a pipe passing down the interior of the trap, and terminating at a point below the level of the water seal in the trap. Any escape of sewer gas is impossible.

NEW APPLICATIONS FOR LETTERS PATENT.

January 11.—530, J. Wilkinson, Preventing Down-draughts in Chimneys.—534, W. & E. Freeman, Shave-hook for Plumbers' use.—536, J. Robson, Burglar-proof Sash-fastener.

January 12.—574, A. & T. Sabine, Machinery for forming the Sockets of Sanitary-pipes, Chimney-pots, &c.—587, R. Thwaites, Preventing Water and Gas-pipes from Freezing.—589, J. Phillips, Method to prevent Pipes Bursting during Frost.—591, W. White & H. Harry, Coverings for Walls, &c.—600, H. Rhodes & R. Holland, Domestic Hearths.—608, R. Spring, Preventing Waste of Water in or from Cisterns.—620, J. Shannon, Wood-graining Machines.

January 13.—651, H. Sayle, New Automatic Noiseless Flushing-valve for Water-closets and Urinals.—663, L. Dove, Automatic Disinfecting Apparatus for attaching to Flushing-cisterns.—680, F. Noar, Head-service Piping.—691, C. Coe, Preventing Waste of Water.—698, A. Boult, Glue.—715, G. Couzens, Gully-traps.—727, J. Rainey, Tool-holding Attachment for Grindstones.

January 14.—C. Griffiths, Stoves.—756, D. Nainby, Preventing Smoky Chimneys.—757, J. Brown, Lock and Latch Furniture.—804, W. Byers, Sliding-bolts for Securing Doors, &c.—805, F. Smythies, Sash-fasteners.

January 15.—814, J. Faulds, Masons' Tools.—827, W. Orr, Metallic Girders.—828, O. Hutchinson, Bakers' Ovens.—854, E. Cooper and E. Turrall, Door Springs and Checks.—861, A. Boult, Carving-machines.—869, G. Dunell, Metallic Flooring or Decking for Bridges, &c.

January 16.—901, A. Wilson and C. Johnson, Joints for Metal Pipes.—905, T. Lane and A. May, Chimney-tops or Cowls.—907, C. Johnson and A. Wilson, Joints for Pipes constructed of Stoneware, &c.

PROVISIONAL SPECIFICATIONS ACCEPTED.

15,471, J. Barlow, Window and other Frames.—17,715, W. Kenney, Butt Joints or Hinges.—20,797, J. Hughes and E. Jones, Screws and Screw-drivers.—20,803, J. Dewhurst, Disinfecting Water-closets, Drains, &c.—21,237, F. Webster and A. Thorman, Fire Stoves, &c.—22,036, W. Tucker, Anti-drip Sash-bar.—22,171, T. Smith, Compounds or Cements.—22,243, T. Bretherton, Paving Roads, &c.—22,428, J. Jackson, Decorative Materials for Walls, Ceilings, &c.—22,526, J. Pearson, Draught and Weather Excluders for Doors.—22,577, J. Martin, Saws.—174, G. Deacon, Glazing Roofs, &c.

COMPLETE SPECIFICATIONS ACCEPTED.

(*Open to Opposition for Two Months.*)

3,070, G. Lawford, Water Waste-preventing Cistern.—3,555, W. Thompson, Concrete-mixing Machines.—4,287, T. Panario, Supplying Disinfectants to the Flushing Pipes of Urinals, &c.—4,484, J. Townshend, Folding or Collapsible Seats.—17,100, W. Douslin, Mortice Locks.—17,375, W. Errington, Stone-cutting and Stone-dressing Machinery.—21,965, J. Bardsley, Door Springs and Checks.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

JANUARY 14.—By *C. C. & T. Moore* (on the premises): No. 40, Oxford-st., the lease and goodwill, u.t. 20 yrs., r. 240*l.*, 310*l.*

JANUARY 19.—By *Dowsett & Co.*: 79, Ringford-rd., Wandsworth, f., r. 28*l.*, 350*l.*; 12, Southfield-rd., f., r. 23*l.* 8s., 230*l.*—By *Slade & Butler*: 7 to 16, Alma-cottages, Harrow, f., r. 104*l.*, 525*l.*; 17 to 21, Alma-cottages, f., r. 66*l.*, 400*l.*—By *Sherrin & Coltman*: 46, Brooksby's-walk, Homerton, f., r. 55*l.*, 905*l.*; 108 to 116 (even), Glenthorne-rd., Hammersmith, u.t. 90 yrs., g.r. 25*l.*, r. 132*l.*, 705*l.*

JANUARY 20.—By *Kelf & Son*: an enclosure of f. land, 7a. 3r. 21p., Folly-lane, Walthamstow, 1,300*l.*; 43, Calabria-rd., Highbury, u.t. 95 yrs., g.r. 8*l.* 15s., r. 42*l.*, 315*l.*

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PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G. ton	9/0/0	0/0/0
Teak, E.I... load	9/10/0	15/0/0
Sequoia, U.S. ft. cu.	2/3	3/0
Ash, Canada load	2/10/0	4/0/0
Birch, do.	3/0/0	4/5/0
Elm, do.	3/10/0	4/15/0
Fir, Dantzic, &c.	2/0/0	3/10/0
Oak, do.	2/10/0	4/10/0
Canada.....	5/0/0	7/0/0
Pine, Canada red	2/10/0	3/10/0
Do, yellow	2/10/0	5/0/0
Lath, D'ntsic, fath	5/5/0	6/10/0
St. Petersburg	5/10/0	7/10/0
Deals, Finland, 2nd & 1st std 100	8/10/0	10/10/0
Do, 4th & 3rd..	7/10/0	8/10/0
Do. Riga	6/10/0	8/0/0
St. Petersburg, 1st yellow ..	10/10/0	15/0/0
Do. 2nd yellow	8/10/0	10/0/0
Do. white ...	7/0/0	10/10/0
Swedish	7/15/0	16/0/0
White Sea	8/10/0	17/10/0
Canada, Pine 1st	19/10/0	25/10/0
Do. do. 2nd....	14/10/0	16/10/0
Do. do. 3rd, &c.	6/10/0	10/10/0
Do. Spruce. 1st	8/10/0	11/0/0
Do. do. 3rd & 2nd.....	6/10/0	8/0/0
New Brunswick	7/0/0	7/10/0
Battens, all kinds	3/10/0	15/10/0
Flooring Boards, sq., 1 in. prep. 1st	0/8/6	0/14/6
Do. 2nd.....	0/7/6	0/11/6
Other qualities	0/5/3	0/8/0
Cedar, Cuba ..ft.	/3½	/4½
Honduras, &c.	/3½	/4½
Mahogany, Cuba.	/4½	/6½
St. Domingo, cargo av	/4½	2'0
Mexican do. do	/4	/5
Tobasco do. do	/5½	/7
Honduras do..	/5½	/6½
Box, Turkey ton	4/0/0	13/0/0
Rose, Rio.....	10/0/0	20/0/0
Bahia	9/0/0	18/0/0
Satin, St. Domingo .....ft.	0/0/9	0/1/3

TIMBER (*continued*).		
Satin, Porto Rico	0/0/10	0/1/6
Walnut, Italian..	0/0/3½	0/0/7
METALS.		
IRON—Pig, in Scotland .....ton	2/7/0	2/7/1½
Bar, Welsh, in London.....	6/0/0	6/10/0
Do. do. at works in Wales	5/10/0	6/0/0
Do. Staffordshire, in London	6/5/0	6/15/0
COPPER—British, cake and ingot	48/0/0	49/0/0
Best selected ..	49/0/0	49/10/0
Sheets, strong..	58/0/0	59/0/0
Chili, bars	44/13/9	45/1/3
YELLOW METAL lb.	0'0/5¾	0/0/5¾
LEAD—Pig, Spanish....ton	10/15/0	10/17/6
English, com. brands	11/2/6	11/5/0
Sheet, English, 3 lbs. per sq. ft. and upwards ..	13/0/0	0/0/0
Pipe	13/10/0	0/0/0
ZINC—English sheet .....ton	25/0/0	25/10/0
Vieille Montagne.....	26/10/0	0/0/0
TIN—Straits	84/17/6	90/7/6
Australian	90/0/0	90/10/0
English Ingots	93/5/0	93/10/0
OILS.		
Linseed .....ton	18/15/0	19/2/6
Cocoanut, Cochin	26/5/0	26/10/0
Do. Ceylon	23/0/0	0/0/0
Palm, Lagos	23/0/0	23/10/0
Rapeseed, English pale	28/15/0	0/0/0
Do. brown	27/0/0	0/0/0
Cottonseed ref...	18/0/0	0/0/0
Oleine	0/0/0	0/0/0
Lubricating, U.S.	4/10/0	5/10/0
Do. refined	6/0/0	11/0/0
TAR—Stockholm barrel	0/19/0	1/0/0
Archangel	0/12/6	0/0/0

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *noon on Thursdays.*]

BILSTON.—For market hall fittings, shops, stalls, offices, &c., and engine and boiler-house for electric light installation, for the Bilston Township Commissioners. Mr. C. L. N. Wilson, C.E., architect:—

Geo. Hall	£2,356	Jas. Light	£1,875
H. Dorse & Son	2,000	Morrell Bros., Bilston*	1,760

* Accepted.

[Architect's estimate, £1,887. 12s. 6d.]

BRISTOL.—For erecting and constructing a sixteen-chamber brick kiln (Sercombe's patent), with flues and 80 ft. Chimney-shaft, for the Netham Brick and Tile Works Company. Mr. Herbert J. Jones, surveyor, Bristol:—

A. Krauss	£2,990	R. Wilkins & Sons	£2,645
W. Galbraith	2,768	Eastabrook & Sons	2,497
G. H. Wilkins	2,750	G. Humphreys	2,374
Cowlin & Son	2,743	J. Perrott, Bristol*	2,346

* Accepted.

CHESHAM (Bucks).—For the construction of a new road, curbing, channelling, and sewering, &c., New Town, Chesham, Bucks, for Mr. D. G. Patterson. Mr. Geo. H. Green, surveyor, Chesham:—

Capper	£771	Hill	£597
Mead	650	Morecroft, Acton (accepted).	570

GREAT YARMOUTH.—For the erection of grand-stand at the Recreation Ground, for the Great Yarmouth Town Council. Mr. J. W. Cockrill, A.R.I.B.A., Borough Surveyor. Quantities by the Borough Surveyor:—

G. Beckett	£1,237 10 0	Eastee	£1,055 12 5
J. Leggett	1,175 0 0	Beech	1,033 0 0
Rand & Cooper	1,170 0 0	Stevens	1,028 0 0
Cork	1,150 0 0	Flaxman	1,021 0 0
M. Barnard	1,098 13 8½	Grimble & Watts	1,020 0 0
J. F. W. Bray	1,088 0 0	Bond, Yarmouth (accepted)	1,015 0 0
W. Bracey	1,056 6 0		

HADLEIGH (Essex).—For erection of various buildings at the Salvation Army Farm Colony. Mr. Alexander Gordon, architect:—

Dairy Buildings.

Neil	£564 10	Morgan	£350 0
Coxhead	549 0	Good	348 10
G. H. Martin & Co.	433 0	Ansell	343 19
Inwood	409 0		

Bakery Buildings.

Coxhead	£323 15	French & Ellwood	£250 0
Good	318 15	Alderton	240 0
Neil	289 0	G. H. Martin & Co.	234 0
Potter	265 10	Inwood	227 0

Covered Cow Yard.

Neil	£3,365	French & Ellwood	£2,096
Coxhead	2,906	Good	1,980
Potter	2,237	Inwood	1,367
G. H. Martin & Co.	2,183		

Slaughter House.

Barlow & Roberts	£511	G. H. Martin & Co.	£335 0
Neil	438	Baxter	314 0
Ansell	366	French & Ellwood	288 0
Inwood	350	E. Good	227 17

Piggery Buildings.

Neil	£828	French & Ellwood	£750
Coxhead	797	Good	743
G. H. Martin & Co.	793	Potter*	688
Ansell	790		

* Accepted.

HASTINGS.—Accepted for the erection of five blocks of artisans' dwellings, in Castle-road. Mr. Mark J. Lansdell, architect:—

Excavations.—G. Davis	£536 5 0
Underpinning.—G. Davis	43 10 0
Patent Stone Steps, Landing, &c.—Elliotts & Co.'s	113 15 0
General Buildings.—Moon & Garner	4,320 0 0

LONDON.—Accepted for alterations, decorations, repairs, and sanitary works, at No. 36, Gloucester-place, Hyde-park, for Miss Ponsford. Mr. T. H. Watson, architect, 9, Nottingham-place, W.:—

Greatorex & Co., Limited, 11, Stanhope-terrace, W. £535

LONDON.—For erecting new sanitary blocks, laying new drains, and supplying new sanitary fittings and other works at the Orphan Woking School, Haverstock-hill, N. Mr. Charles Bell, F.R.I.B.A., architect. Mr. Edward Tidman, C.E., F.S.I., consulting engineer:—

Clarke & Bracey	£4,383	Irwin Wallas	£3,589
Holiday & Greenwood	4,139	Allen & Sons	3,550
Burford & Sons	3,886	Geo. Bryan & Sons	3,508
Wall	3,647	Geo. Sharp	3,360

LONDON.—For cleaning down stone-facings and painting all woodwork, 101, 103, and 105, Queen Victoria-street, E.C. Mr. A. Gordon, architect:—

Coxhead	£158	G. H. Martin & Co.	£109
Good	112	Tout (accepted)	100

LONDON.—For erecting cookery and laundry centres and schoolkeeper's house on the Charing Cross-road site, Soho, for the School Board for London. Mr. T. J. Bailey, Architect :—

J. T. Chappell	£4,583	T. Boyce	£3,729
S. & W. Pattinson	4,526	E. Lawrance & Sons	3,461
H. Lovatt	4,295	M. Marsland	3,453
W. M. Dabbs	4,185	C. Cox*	3,366
Treasure & Son	3,923		

* Recommended by the Works Committee for acceptance.

LONDON.—For providing and fixing heating apparatus on the low pressure hot-water system for the Deaf and Dumb School which is now in course of erection on the Hugh Maddelton site, Clerkenwell, for the School Board for London. Mr. T. J. Bailey, Architect :—

Rosser & Russell, Limited	£233 10	J. Fraser & Son	£193 17
J. & F. May	230 0	J. Wontner Smith, Gray, & Co.	188 0
G. Davis	229 10	Purcell & Nobbs*	164 0
W. G. Cannon	210 0		

* Recommended by the Works Committee for acceptance.

LONDON.—For building a shed for manual training purposes in the boys' playground of the Medburn-street School, St. Pancras, for the School Board for London. Mr. T. J. Bailey, Architect :—

H. C. Clifton	£244	G. Ball	£213
Kirby & Chase	235	Norris & Luke*	194
J. Peattie	226		

* Recommended by the Works Committee for acceptance.

ROMFORD.—For alterations and additions in forming Refrigerator and Wort Receiver Rooms, and alterations in Cooler Room, at the Brewery, Romford, for Messrs. Ind, Coope, & Co. Messrs. Inskipp & Mackenzie, architects, No. 5, Bedford-row, W.C. Quantities by Messrs. R. L. Curtis & Sons :—

Dowsing	£1,180	Kirk & Randall	£1,102
Morter	1 172	Watson*	1,098
Hammond	1,149		

* Accepted.

ST. HELEN'S.—For the erection of shop, show-rooms, warehouses, and workshops, for Mr. John Jones. Mr. W. Wallace-Gandy, architect, St. Helen's :—

G. Waizbom & Son	£1,892 0 0	S. Beckett	£1,820 0 0
F. Clarke	1,856 4 0	R. Ellison*	1,810 0 0
R. H. Davis	1 839 0 0		
W. Molyneux	1,829 0 0		

* Accepted.
[All of St. Helen's.]

WOOD GREEN.—For the erection of mission-hall. Mr. J. Williams Dunford, architect, 100c, Queen Victoria-street :—

Baker	£900	French & Ellwood	£575
Good	657	Say	512
G. H. Martin & Co.	633	A. Martin	506
Coxhead	627		

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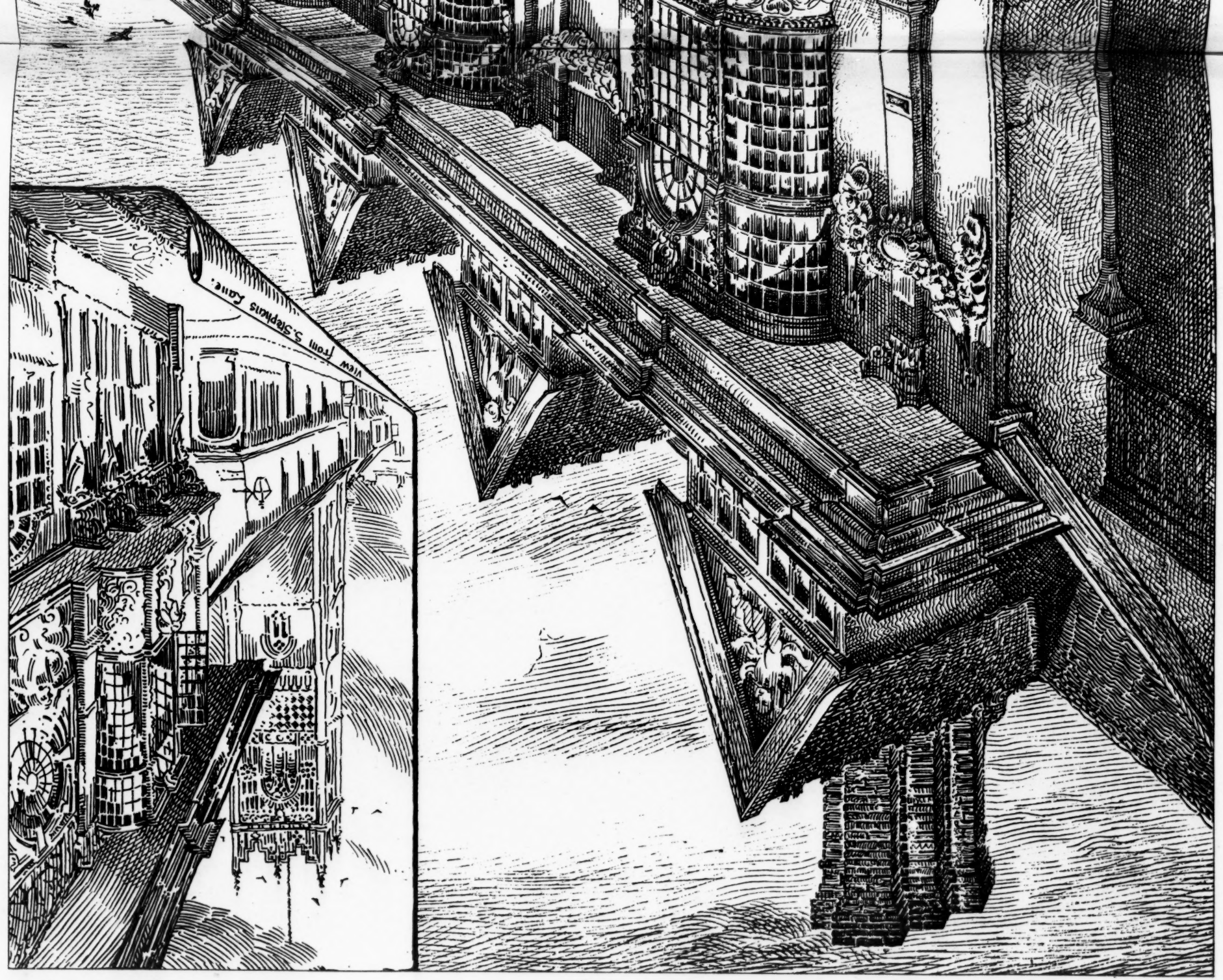
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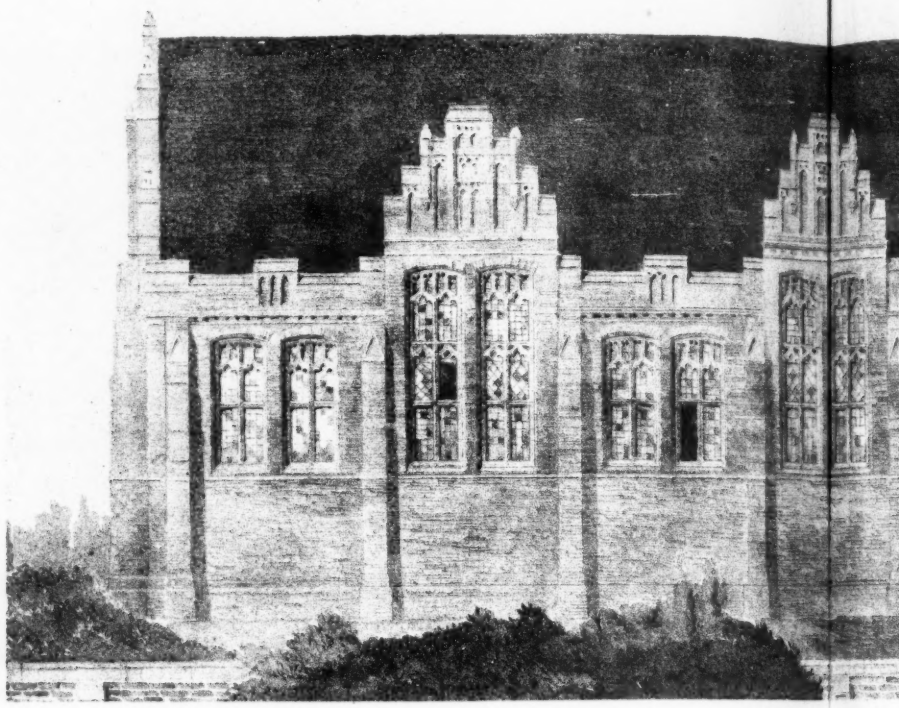

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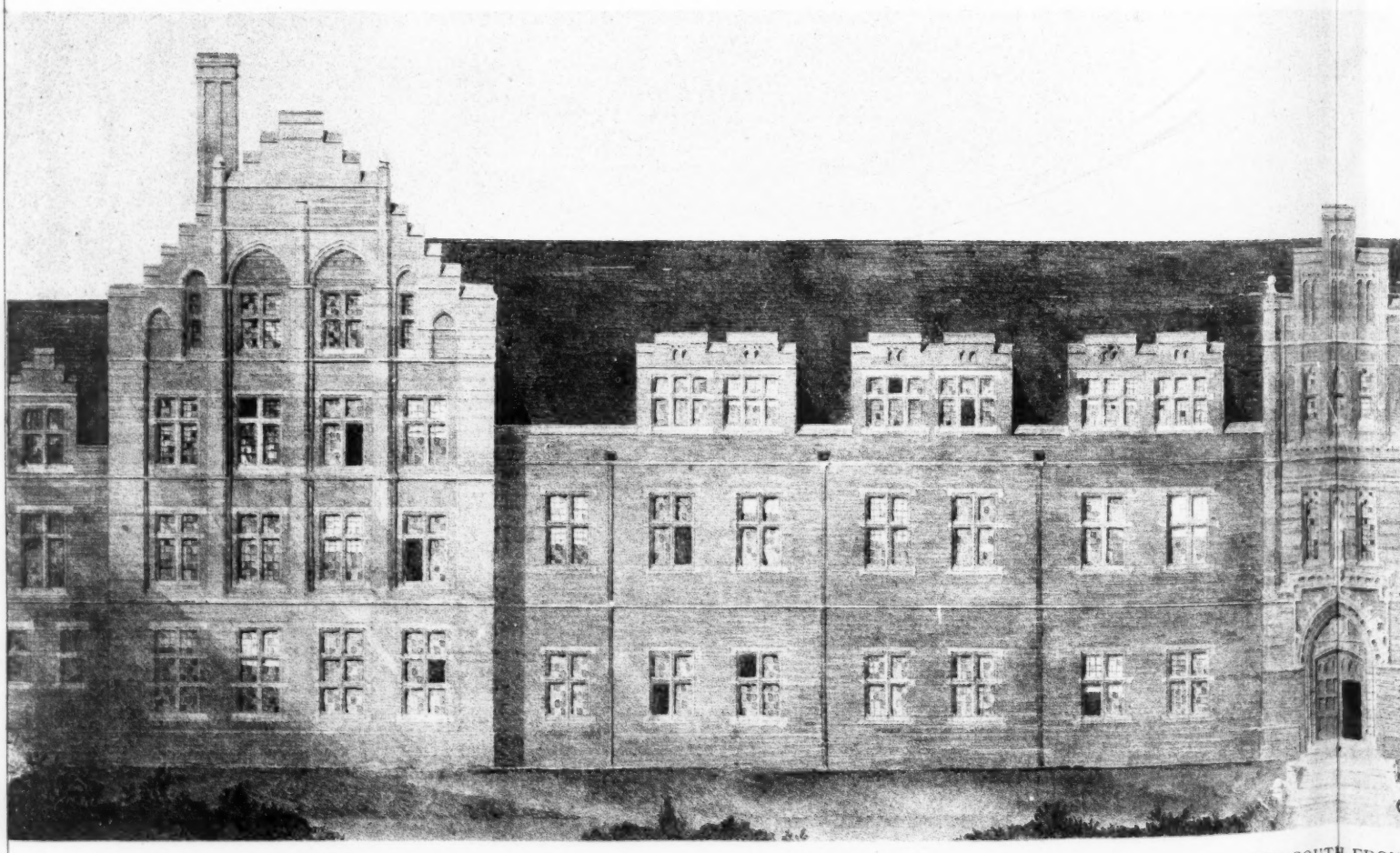

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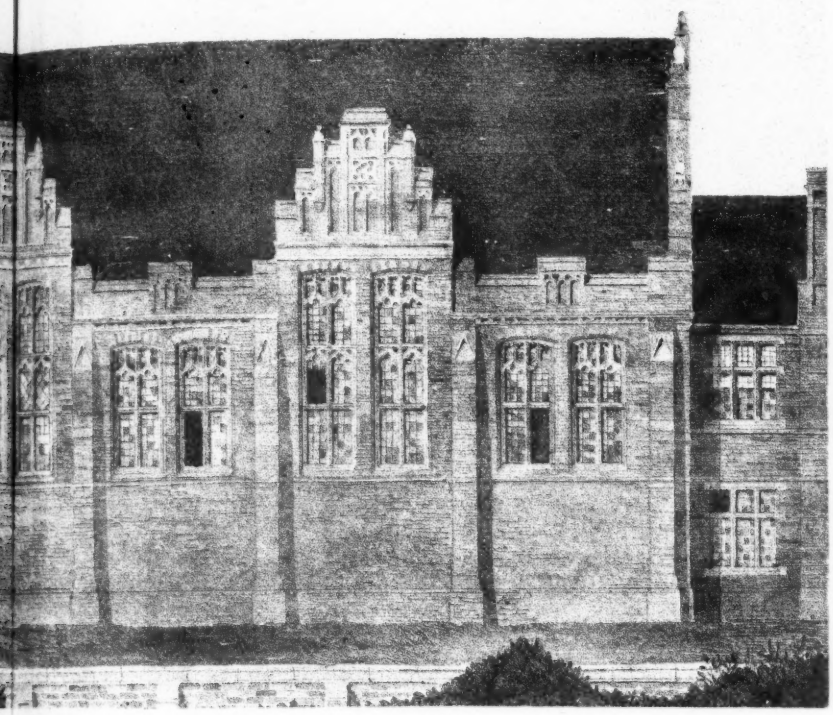

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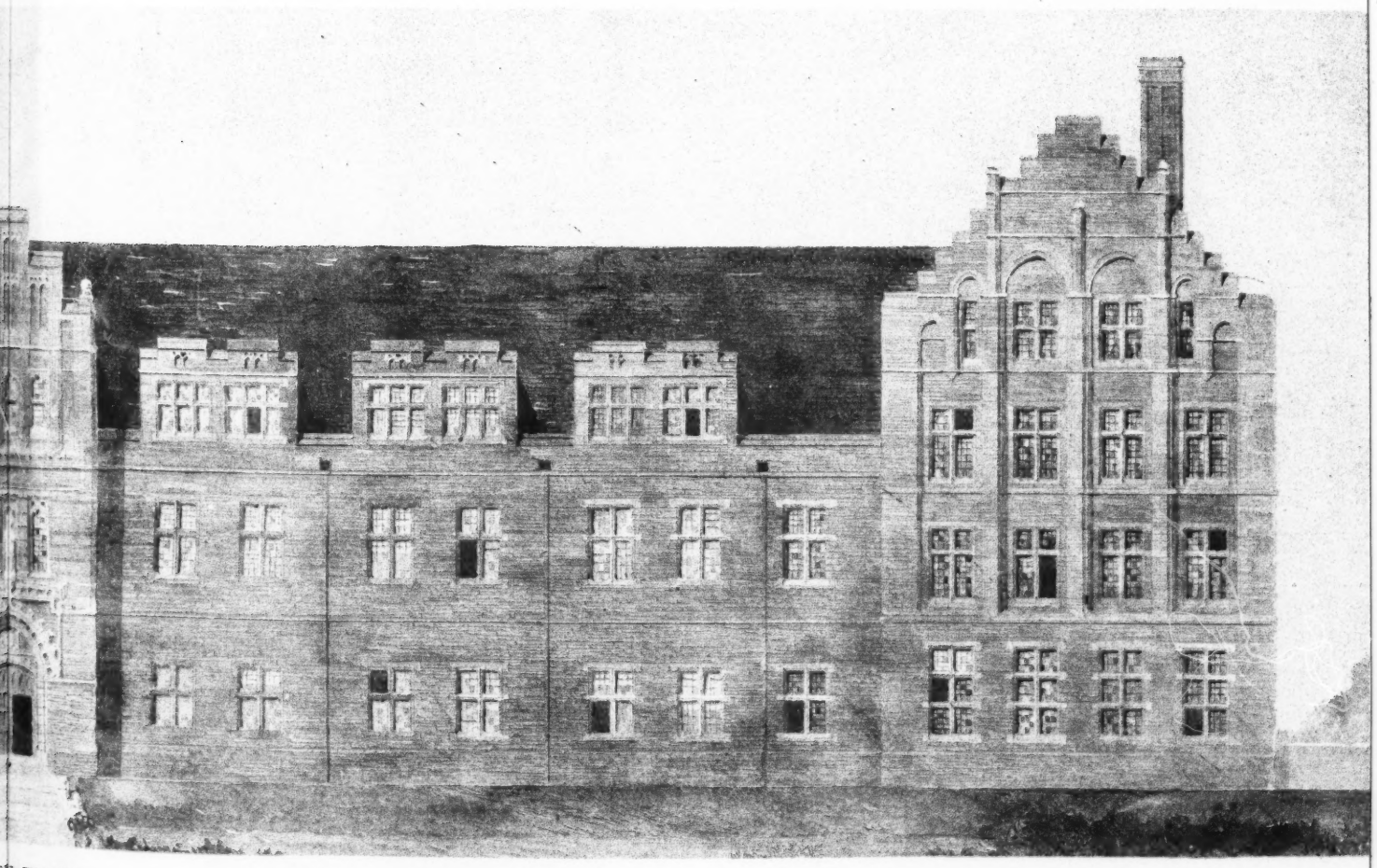

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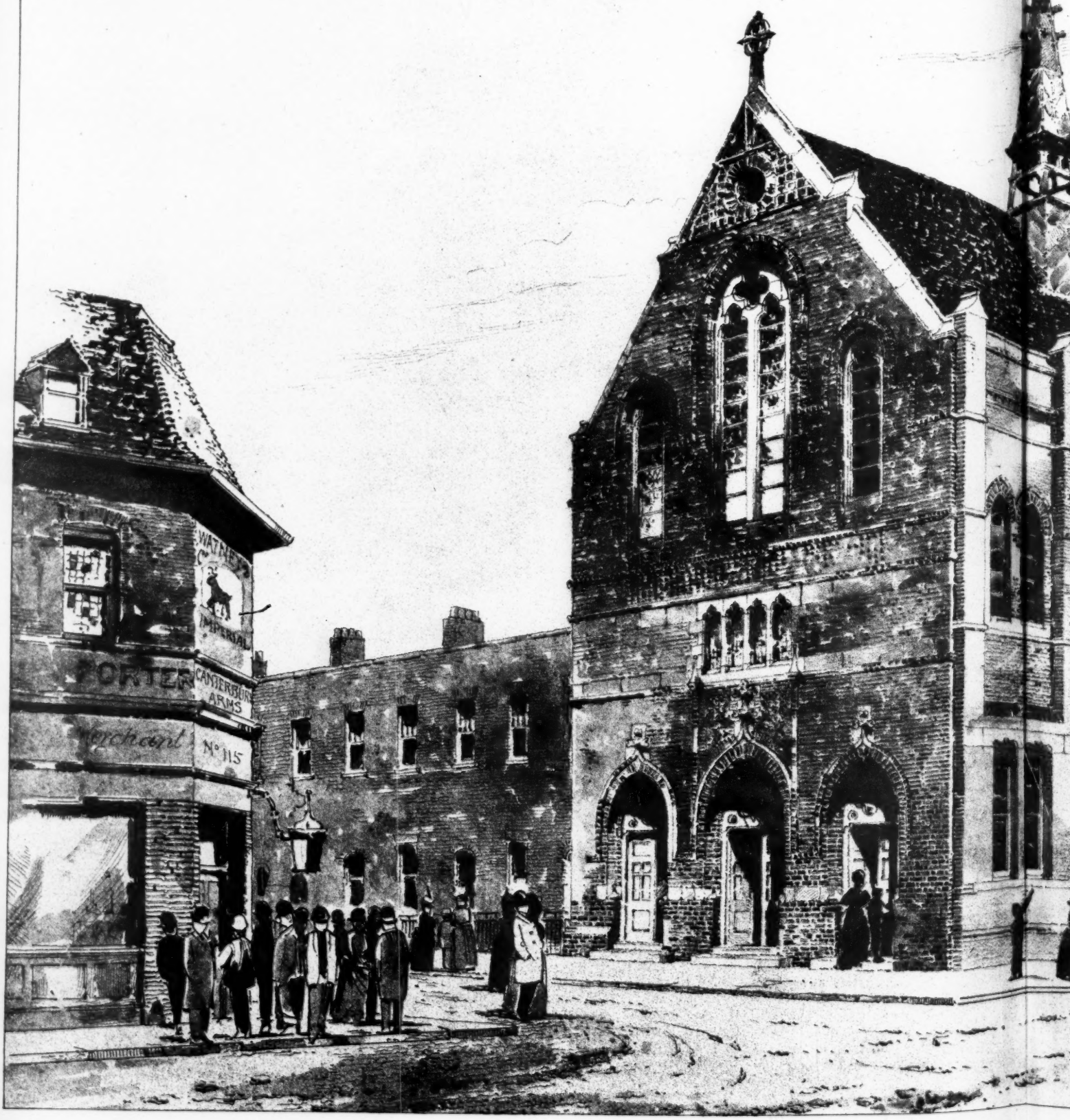

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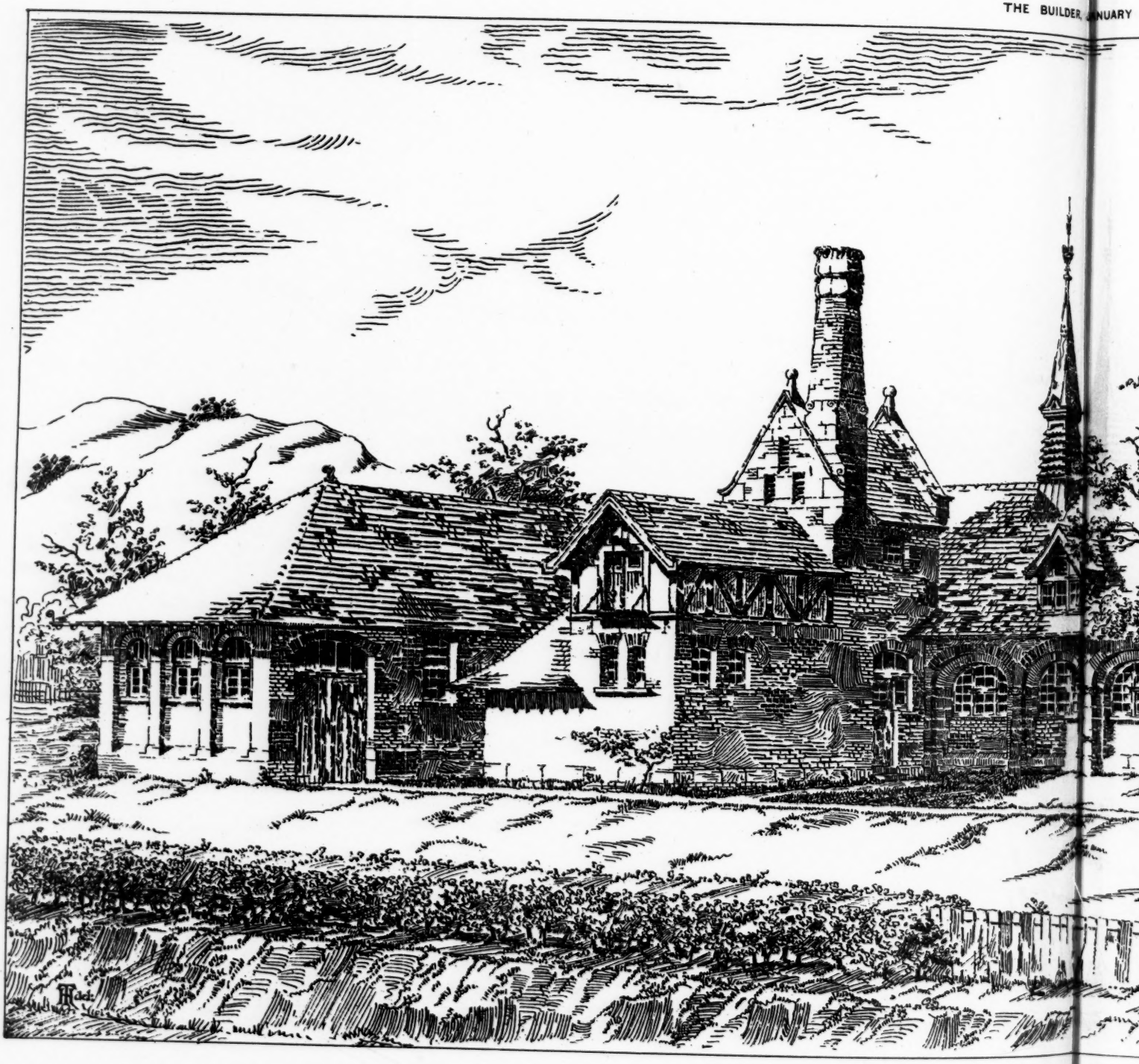

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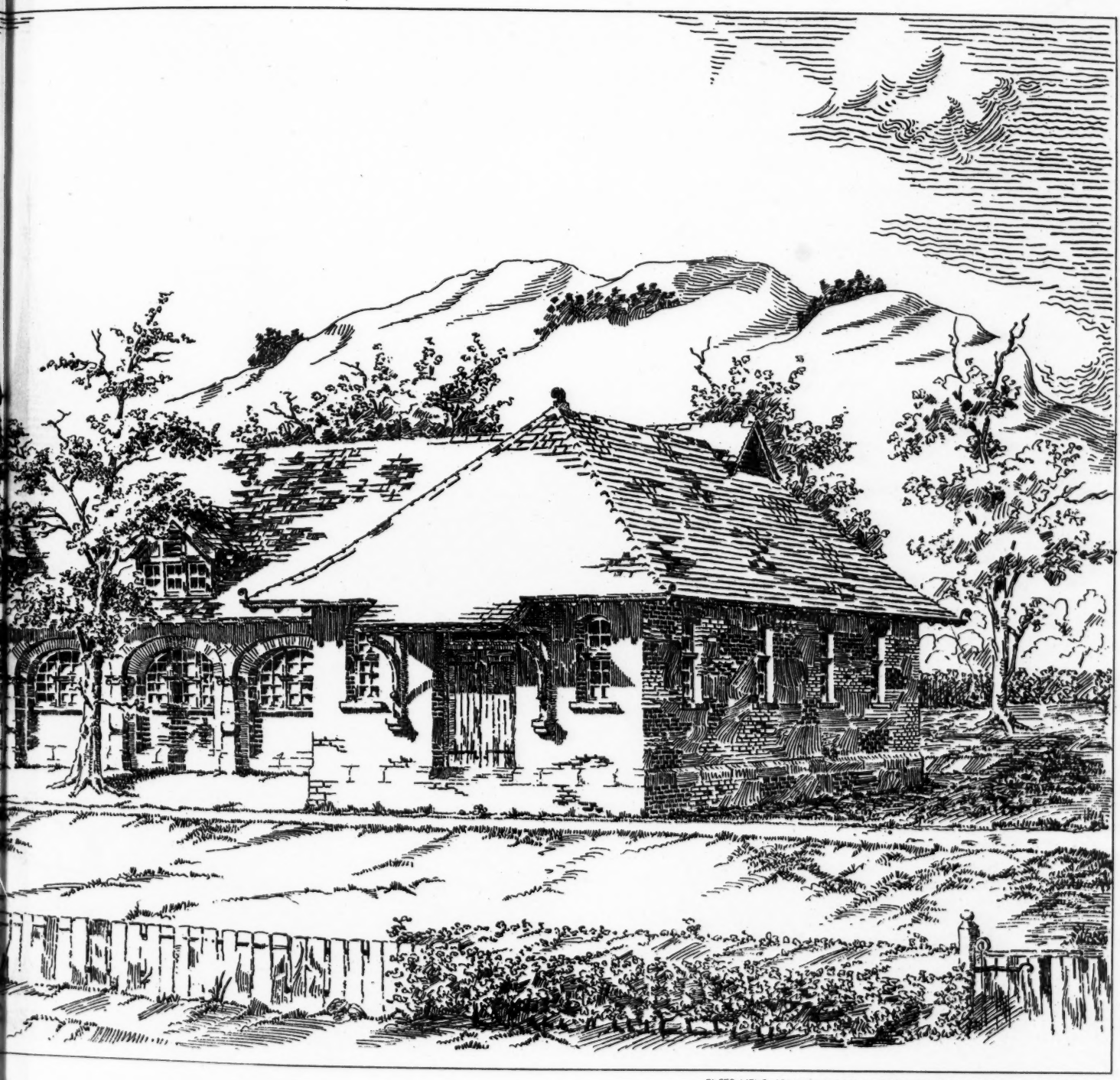

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RN.—Messrs. Truefitt & Truefitt, Architects.